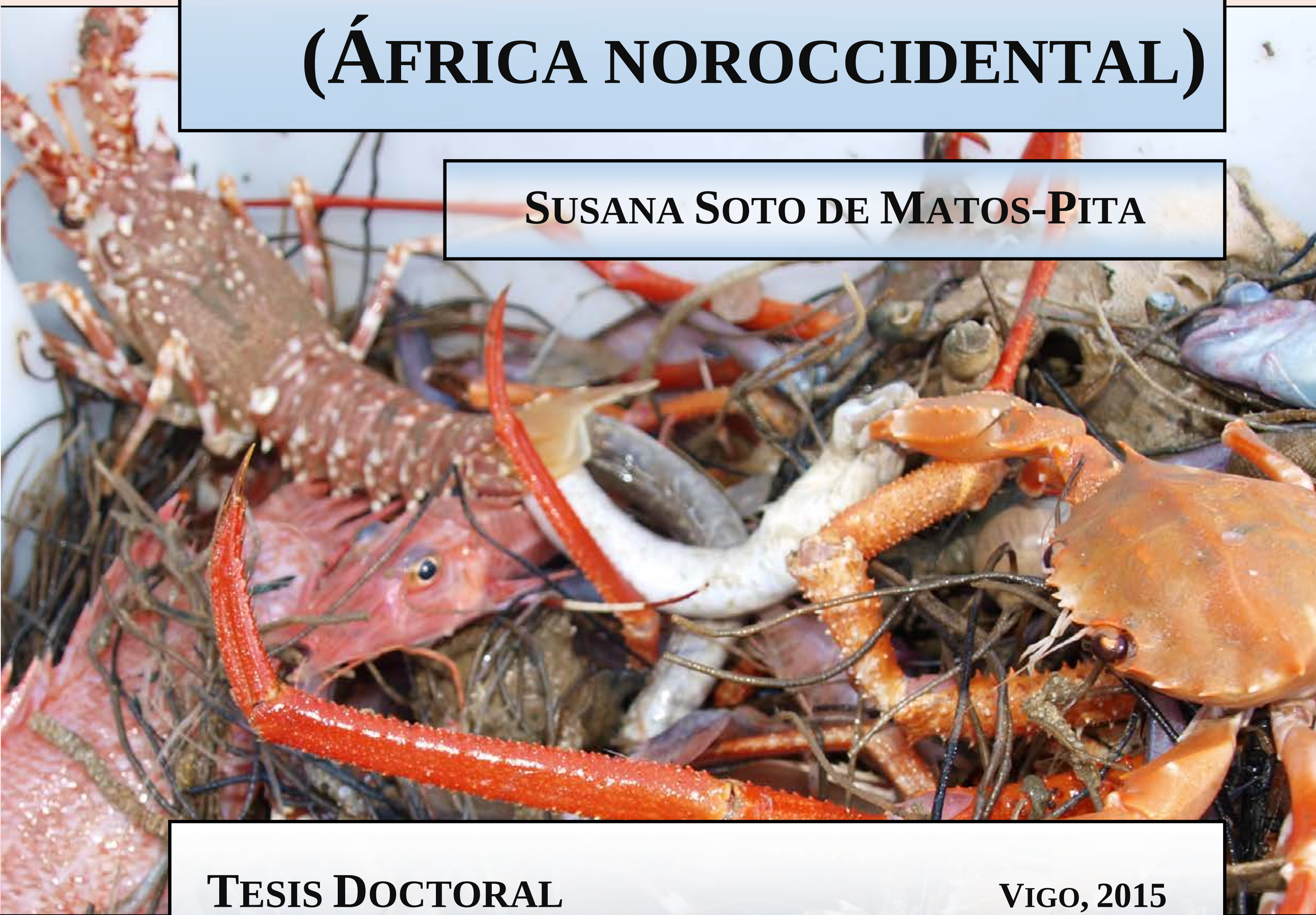
CRUSTÁCEOS DECÁPODOS DE AGUAS PROFUNDAS DE MAURITANIA (ÁFRICA NOROCCIDENTAL)

SUSANA SOTO DE MATOS-PITA



TESIS DOCTORAL

VIGO, 2015

DEPARTAMENTO DE ECOLOGÍA Y BIOLOGÍA ANIMAL

Universida de Vigo

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Universidade Vigo

INSTITUTO ESPAÑOL DE OCEANOGRAFÍA 1914

Universidade de Vigo

Departamento de Ecoloxía e Bioloxía Animal

LOS DOCTORES FRANCISCO RAMIL BLANCO, PROFESOR TITULAR DEL ÁREA DE ZOOLOGÍA DEL DEPARTAMENTO DE ECOLOGÍA Y BIOLOGÍA ANIMAL DE LA UNIVERSIDAD DE VIGO, Y **ANA RAMOS MARTOS**, INVESTIGADORA TITULAR DEL INSTITUTO ESPAÑOL DE OCEANOGRAFÍA, CENTRO OCEANOGRÁFICO DE VIGO.

Certifican:

Que la Memoria titulada **"Crustáceos decápodos de aguas profundas de Mauritania (África Noroccidental)"**, que presenta Dña. Susana Soto de Matos-Pita para optar al título de Doctora por la Universidad de Vigo en la modalidad de compendio de artículos, ha sido realizada bajo nuestra dirección en el Departamento de Ecología y Biología Animal de la Universidad de Vigo. Y considerando que representa un trabajo de Tesis Doctoral, autorizamos su presentación ante el Consejo de Departamento y la Comisión de Estudios de Doctorado.

Y para que así conste a los efectos oportunos, firmamos la presente en Vigo, a 15 de Septiembre de 2015.

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Nada es imposible, solo improbable…

Lo maravilloso de aprender algo es que nadie puede arrebatárnoslo
(B. B. King)

Foto portada y contraportada: Ana Ramos Martos

AGRADECIMIENTOS

Largo ha sido el camino y muchas las personas que me he ido encontrando en él. Con algunas he compartido una buena parte del recorrido, mientras que otras han aparecido y desaparecido con rapidez. Recordarlas a todas se convierte en un reto del que me cuesta responsabilizarme… porque temo que quede alguien por mencionar… alguien que no debería haber sido olvidado…

Han sido varias las campañas oceanográficas en las que he participado, pero solamente una en aguas de Mauritania, a bordo del B/O Vizconde de Eza… aquella en la que tuve mi primer gran contacto con la identificación de los crustáceos africanos y de la que conservo un vívido recuerdo. Las muchas horas de trabajo y la falta de sueño se vieron recompensadas con creces por esos pequeños momentos 'chispa' con los compañeros, que tanto te sorprendían cuando menos lo esperabas. Recuerdo cuando me vertieron un cubo de agua fría por encima mientras esperaba a que el siguiente arrastre llegara a bordo en un día de calor asfixiante, o cuando con barro hasta los codos me acercaban a la boca un trozo de tarta que acaba de sacar el cocinero 'para que pudiera probarlo antes de que se terminara', o las ocasiones en que me permitían seguir trabajando en la informatización de los datos mientras me sustituían en el 'turno de limpieza'…y …tantos otros momentos cuyo recuerdo aún hoy en día me hace sonreír. Con muchos de ellos no he vuelto a coincidir, pero a pesar del breve espacio de tiempo compartido, apenas un mes, nunca olvidaré a mis compañeros de la Maurit-1011, tanto al personal científico como a la tripulación del buque. Todos ellos, y otros muchos que participaron en las otras campañas Maurit, han contribuido en mayor o menor medida a que esta memoria fuera posible. Mis mejores deseos y mi sincero agradecimiento para todos ellos.

El convenio de colaboración suscrito entre la Universidad de Vigo y el Instituto Español de Oceanografía ha permitido el estudio taxonómico, no sólo de los crustáceos decápodos que se presentan en esta memoria, sino del conjunto de la fauna bentónica del noroeste africano, en el que trabajamos actualmente y cuyos resultados van viendo la luz poco a poco. Quiero agradecer los esfuerzos de todos los implicados en el proceso, en especial a Salustiano Mato, rector de la Universidad de Vigo, y a Eduardo Balguerías, director del Instituto Español de Oceanografía. No menos importante en todo este proceso ha sido la labor de los investigadores principales de los grupos de investigación implicados en el convenio, hacia quienes siento un profundo agradecimiento; a ti, Fran, por la oportunidad de trabajar en lo que nos apasiona, por lo mucho vivido en estos años, por tu apoyo… por tu amistad… y a ti, Ana, por ser como eres, incombustible, siempre optimista, luchadora incansable… siempre hasta el final…

A mis compañeras, a las que fuisteis apareciendo poco a poco por el laboratorio para implicaros en el proyecto africano, entusiastas, trabajadoras… y en muchas ocasiones sufridoras también… Sara, por tu buen talante, siempre dispuesta a escuchar, siempre con una sonrisa para alegrarnos el día; a Marta, infatigable, fiel y cumplidora; a Belén, por estar ahí…

No quiero dejar pasar la ocasión de mencionar aquí también a todos aquellos con los que he compartido laboratorio o 'pasillo' en la facultad, por su buen hacer, por sus consejos, por su compañía… especialmente a vosotras, Luisa, Pachila, Josefina, Elsa… de todos he aprendido algo… ese algo que nadie me podrá arrebatar…

A los amigos, a mi familia, a vosotros, Javi, Candela… por todo el tiempo que os robé… por vuestra comprensión y confianza… por vuestra paciencia… sin vuestro apoyo no habría sido posible.

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INTRODUCCIÓN

CONTEXTO

La Región del Gran Ecosistema Marino de la Corriente de Canarias, dentro de la cual se localiza Mauritania, constituye una de las áreas más productivas de todos los océanos (Demarcq y Benazzouz, 2015). Esta elevada productividad está ligada a los afloramientos de aguas profundas y frías cargadas de nutrientes que se producen, por un lado, en la región del Sáhara Occidental, al norte de Cabo Blanco (21º–26ºN), en donde el fenómeno es permanente a lo largo de todo el año, y por otro, en la zona comprendida entre Cabo Timiris, Mauritania, y Cabo Roxo, Guinea Bissau (19º–12ºN), en donde el afloramiento es estacional (Croper et al., 20014) coincidiendo con la zona de desplazamiento del frente térmico (CCLME, 2015; Pelegrí y Peña-Izquierdo, 2015). La región se encuentra bajo la influencia de la Corriente de Canarias, cuyas aguas superficiales son relativamente frías como resultado del afloramiento y que fluyen a lo largo de la costa africana de norte a sur, entre los 30°N y los 10°N, alcanzando los 20°W mar adentro (Heileman y Tandstad, 2008). Además, a nivel de cabo Blanco se origina un filamento gigante hacia mar abierto que exporta la elevada productividad hasta 600 km fuera de la costa (Gabric et al., 1993; Fischer et al., 2009; Sangrá, 2015) favoreciendo la aparición de fondos eutróficos en aguas profundas (Cosson et al., 1997; Galeron et al., 2000).

La presencia de afloramientos de aguas frías y la influencia de la Corriente de Canarias hacen que estas aguas sean conocidas por su alta productividad, su riqueza pesquera y la existencia de importantes criaderos de peces (Loeuff y von Cosel, 1998), convirtiendo la ZEE de Mauritania en objeto de una importante actividad pesquera, sobre todo desde mediados del siglo XX. Aunque los pequeños pelágicos y los peces demersales han sido objeto de importantes pesquerías, es la actividad de los arrastreros dedicados a la captura de cefalópodos y crustáceos la que ocasiona una mayor presión pesquera sobre el ecosistema. Por otra parte, el agotamiento de los recursos de la plataforma ha ocasionado durante las últimas décadas el desplazamiento de las flotas de arrastre hacia aguas cada vez más profundas a la búsqueda de nuevos caladeros, amenazando ecosistemas cuya biodiversidad, estructura y funcionamiento son, en muchos aspectos, desconocidos.

Tradicionalmente la evaluación de los recursos demersales se han basado en el estudio de los stocks de las especies objetivo sin referencias al conjunto del ecosistema, a pesar de que el estudio de las comunidades bentónicas y los cambios que se producen en su composición específica son buenos indicadores de la presión que ejerce la explotación pesquera en un área determinada (Muñoz et al., 2012). No obstante, en los últimos años la comunidad internacional ha mostrado una creciente preocupación por la conservación de la biodiversidad de los mares, demandando un nuevo enfoque para la gestión integral de los océanos. Esta preocupación ha encontrado eco en las Naciones Unidas y otros organismos internacionales, que han comenzado a desplegar una fuerte actividad encaminada a promover la protección de los ecosistemas y la reglamentación de la pesca de arrastre en los márgenes continentales, tanto bajo jurisdicción nacional como en aguas libres. Así, la Asamblea General de las Naciones Unidas (AGNU) dictó, ya en 2007, una resolución en la que se exhorta a los estados a que adopten y apliquen medidas para identificar y proteger sus ecosistemas marinos, mejorando la investigación científica y la cooperación transfronteriza, alentándolos además a aplicar el enfoque basado en el estudio de los ecosistemas para la gestión y la ordenación de sus pesquerías. El conocimiento del bentos es por lo tanto imprescindible cuando se pretende abordar el ejercicio de una pesca responsable, la gestión duradera de los recursos vivos y la protección de los mares sobre la base de una aproximación holística y por lo tanto su estudio ha sido siempre uno de los objetivos de las campañas *Maurit* (Ana Ramos, proyecto EcoAfrik)

ANTECEDENTES EN LAS COSTAS DEL NOROESTE AFRICANO

El conocimiento de la fauna bentónica del litoral noroccidenal africano está ligado fundamentalmente a las diferentes campañas oceanográficas que desde finales del siglo XIX recorrieron estas aguas. Asimismo, los diferentes programas de investigación desarrollados durante la época colonial contribuyeron de forma significativa al conocimiento de la fauna marina de la zona costera de la región.

Entre las grandes expediciones científicas que incluyeron en su derrota el noroeste de África, cabe destacar la primera gran campaña oceanográfica alrededor del mundo realizada a bordo del HMS *Challenger* (1872–1876), durante la cual se recogieron las primeras muestras de la fauna de aguas profundas de esta región. Asimismo debemos mencionar las expediciones realizadas en el Atlántico Norte por diferentes instituciones europeas como fueron las del *Travailleur* y *Talisman* (1880–1883), las auspiciadas por el príncipe Alberto I de Mónaco (1885–1920), la del buque noruego *Michael Sars* (1910), las del buque escuela belga *Mercator* (1935–1936 y 1938) y la NORATLANTE a bordo del navío francés *Jean Charcot* (1969). Todas ellas recogieron muestras en la zona comprendida entre el estrecho de Gibraltar y las islas de Cabo Verde.

Entre las campañas oceanográficas desarrolladas exclusivamente en el noroeste africano adquieren especial relevancia las realizadas por los alemanes a bordo de la *Gazelle*, que incluyeron también las Islas de Cabo Verde y Ascensión (1874–1876), el viaje de la goleta francesa *Melita* en aguas de Canarias y Senegal (1889–1890), las campañas danesas a bordo del *Atlantide* a lo largo de la costa tropical africana (1945–1946), las expediciones francesas en las costas del noroeste africano, Golfo de Guinea y costas de Cabo Verde a bordo de los buques *Calypso* (1956) y *Thalassa* (1962, 1968, 1971), las americanas en el Golfo de Guinea a bordo de la *Pillsbury* (1964, 1965) y la campaña española *Atlor VII* en aguas del Sahara y Mauritania en el *Cornide de Saavedra* (1975). También debemos mencionar aquí las siete campañas holandesas del programa CANCAP (1976–1988), desarrolladas a bordo de los buques de la Marina Real Holandesa *Onversaagd* y *Tydeman* en la región Macaronésica (Azores–Cabo Verde), que incluyeron el margen continental africano, desde Marruecos a Senegal; en este caso los muestreos se realizaron desde la zona costera hasta los 4000 m de profundidad.

En todas las campañas anteriormente mencionadas, incluyendo las CANCAP, la mayoría de las muestras se recogieron fundamentalmente en la plataforma continental y talud superior, sobrepasando en muy pocas ocasiones la isóbata de los 1000 m, lo que hace de la fauna de aguas profundas del noroeste africano una de las menos estudiadas a nivel mundial (Lewis, 2004). Las mayores contribuciones en este campo proceden de los resultados obtenidos en las campañas francesas BALGIM (1984), realizada a bordo del B/O *Cryos* en el Golfo Ibero-Marroquí y Mar de Alborán, y la SEAMOUNT I, en el B/O *Le Noroit*, en las montañas submarinas de la región lusitánica, cuya fauna presenta claras afinidades con la del noroeste africano (Proyecto EcoAfriK, datos no publicados).

Si nos referimos a Mauritania en particular, a pesar de las numerosas campañas que pasaron frente a sus costas, son pocos los muestreos que se realizaron en sus aguas, estando la mayoría de ellos circunscritos a la zona de Cabo Blanco y Banco de Arguin. La primera campaña que se llevó a cabo exclusivamente en aguas mauritanas se remonta a la francesa *Mission Gruvel* (1909–1910) que se desarrolló a lo largo de toda su costa, desde la Bahía de Nouadhibou, en el norte, hasta la frontera con Senegal, en el sur. Posteriormente y durante la época colonial, diferentes organismos promovieron la investigación marina en la zona litoral, a través de campañas locales como las realizadas en Mauritania, Senegal y Guinea por el IFAN (Institut Fondamental de l’Afrique Noire) entre 1939 y 1963, o las llevadas a cabo en Mauritania, Senegal, Guinea, Costa de Marfil, Camerún y Congo por el ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer, actual Institut Français de Reserche pour le Développement en Coopération) entre 1944 y 1953. Además, la zona del Banco de Arguin, entre cabo Blanco y cabo Tímiris, ha sido objeto de estudio específico durante las campañas holandesas CANCAP III (1978) y la TYRO-Mauritania II (1988), esta última desarrollada íntegramente en dicha zona. Como ya indicamos, la mayoría de los muestreos se realizaron en la plataforma continental y talud superior; solamente 10 estaciones se localizaron entre los 500 y los 1000 m y cuatro a profundidades mayores, entre 1000 y 2300 m. Más recientemente ha tenido lugar la campaña alemana MSM16/3 PHAETON a bordo del buque oceanográfico *Maria S. Merian* en 2010 (Westphal et al., 2013).

La mayor parte de los resultados de las campañas anteriormente mencionadas se han reflejado tanto en series monográficas como en publicaciones específicas sobre diferentes grupos faunísticos. Entre los primeros habría que señalar, por su importancia, los “Report of the scientific results of the voyage of the HMS *Challenger* during the years 1873–76”, los de las “Expéditions scientifiques du *Travailleur* et du *Talisman* pendant les années 1880, 1881, 1882, 1883”, los “Résultats des campagnes scientifiques accomplies sur son yacht par Albert Ier, prince souverain de Monaco”, los “*Atlantide* Report” o los “Résultats Scientifiques des Campagnes de la *Calypso*”. Entre los numerosas trabajos científicos publicados en diferentes revistas cabe mencionar los resultados derivados de las campañas holandesas CANCAP y Tyro Mauritania II (que incluyen más de 120 contribuciones publicadas en las revistas del Rijksmuseum van Natuurlije Historie de

Leiden, actual Naturalis Biodiversity Center), y de las francesas BALGIM y SEAMOUNT I. Sin embargo, todavía una parte importante de las colecciones recogidas por las numerosas campañas oceanográficas citadas permanece almacenada en museos e instituciones científicas, o bien está actualmente en estudio.

LA FAUNA DE DECÁPODOS DE ÁFRICA OCCIDENTAL

Los decápodos constituyen el grupo de crustáceos de mayor diversidad específica (Crandall et al., 2009) siendo además uno de los grupos de invertebrados megabentónicos dominante en la plataforma y talud continental del océano Atlántico (Muñoz et al., 2012). Cabe destacar asimismo la diversidad morfológica y el éxito evolutivo del grupo, así como la importancia económica de muchas de sus especies (Martin y Davis, 2001), lo que lo ha convertido en objetivo de numerosos estudios, siendo ya desde el siglo XIX el grupo de invertebrados mejor conocido en el oeste africano.

De hecho, existen importantes monografías que han sentado las bases del conocimiento de los crustáceos decápodos en la región occidental de África. Así, podemos citar los trabajos de Barnard (1950) y Kensley (1981), sobre los decápodos del sur de África, Crosnier y Forest (1973) sobre las gambas y camarones profundos del Atlántico oriental tropical, Manning y Holthuis (1981) acerca de los braquiuros del oeste africano, Macpherson (1983, 1991) respecto a los decápodos de las costas de Namibia o el trabajo de García-Raso (1996) sobre los decápodos del golfo Ibero-Marroquí. A estas publicaciones debemos añadir algunos trabajos generales de crustáceos como son los de Studer (1883), Milne-Edwards y Bouvier (1897a, 1898) o Gruvel (1913), los dedicados al estudio particular de los decápodos como los de Milne-Edwards y Bouvier (1899), Bouvier (1917, 1922) o Anadon (1981), y aquellos trabajos dedicados al estudio de algún grupo en particular como son los de Hansen (1922, 1927) y Burkenroad (1940) sobre dendrobranqiados, Holthuis (1951), Crosnier y Forest (1966), Iwasaki (1990) y Fransen (1997, 2002) acerca de los carídeos, Gruvel (1911) respecto a los aquelados, Saint Laurent y Le Loeuff (1979) sobre los talasinídeos, Balss (1913) y Miyake y Baba (1970) sobre los galateidos, Milne-Edwards (1891), Chevreux y Bouvier (1892), Forest (1961, 1966) y Forest y de Saint Laurent (1967), acerca de los cangrejos ermitaños, y los de Milne-Edwards y Bouvier (1894b, 1900), Capart (1951), Forest y Guinot (1966), Manning (1993) y Henriksen (2009) sobre braquiuros.

En relación a Mauritania, del conjunto de publicaciones anteriormente citadas se pueden extraer referencias sobre algunas especies, lo que nos ofrece solamente una visión fragmentada e incompleta sobre los decápodos presentes en sus aguas. Bouvier (1906b) incluye por vez primera un listado de los decápodos recogidos en el Banco de Arguin, Monod (1933) recopila las referencias de todos los crustáceos decápodos citados en las costas de Mauritania, principalmente en la zona litoral poco profunda, y Maurin (1968) describe las biocenosis bentónicas del noroeste africano a partir de datos obtenidos en el transcurso de las campañas de la *Thalassa*, que incluye una lista de los crustáceos recogidos en Cabo Blanco, el Banco de Arguin y la zona comprendida entre Cabo Timiris y Tamxat. Asimismo, cabe destacar el informe preliminar de los decápodos capturados durante las campañas CANCAP y TYRO-Mauritania II publicado por Fransen (1991), que representa una importante contribución al conocimiento del grupo. Más recientemente, el único trabajo sobre el estudio de los crustáceos decápodos de Mauritania es el de Sakai et al. (2015), referido al estudio de los talasinídeos del Banco de Arguin.

En cuanto a la composición y estructura de las comunidades de crustáceos del oeste africano, los estudios son todavía muy escasos y derivan fundamentalmente de los datos obtenidos en campañas de evaluación de recursos pesqueros y sobre el efecto de la pesca de arrastre en los ecosistemas bentónicos (Macpherson, 1991; Muñoz et al., 2012).

ESTRUCTURA DE LA MEMORIA

La memoria titulada "Crustáceos decápodos de aguas profundas de Mauritania (África Noroccidental)" que se presenta para la obtención del Título de Doctor por la Universidad de Vigo, se ha realizado en la modalidad de compendio de artículos de investigación. Siguiendo la normativa esta Universidad se incluyen una introducción y una discusión que justifican y dotan de coherencia a los diferentes artículos que la componen, un apartado de conclusiones y la bibliografía común. Para la exposición de los resultados se adjuntan los artículos de investigación, cada uno de ellos precedido por una reseña en la que se amplía la información aportada en cada publicación.

OBJETIVOS

El objetivo general de esta memoria de doctorado es el estudio de los crustáceos decápodos de aguas profundas de las costas de Mauritania tratando de contribuir a un mejor conocimiento de la fauna marina del noroeste de África.

Este objetivo general incluye los siguientes objetivos específicos:

- Realización de un inventario de los crustáceos decápodos recolectados en las cuatro campañas *Maurit*.

- Estudio taxonómico detallado de quirostiloideos, galateidos, paguroideos, talasinídeos y braquiuros que incluye:

    - Descripción de nuevos taxa para la ciencia
    - Redescripción de especies poco o mal conocidas, incluyendo discusiones taxonómicas que puedan contribuir su identificación
    - Contribuir a un mejor conocimiento de la biología y ecología de las especies identificadas
    - Analizar los patrones de distribución geográfica y batimétrica de las especies estudiadas a nivel regional y mundial.

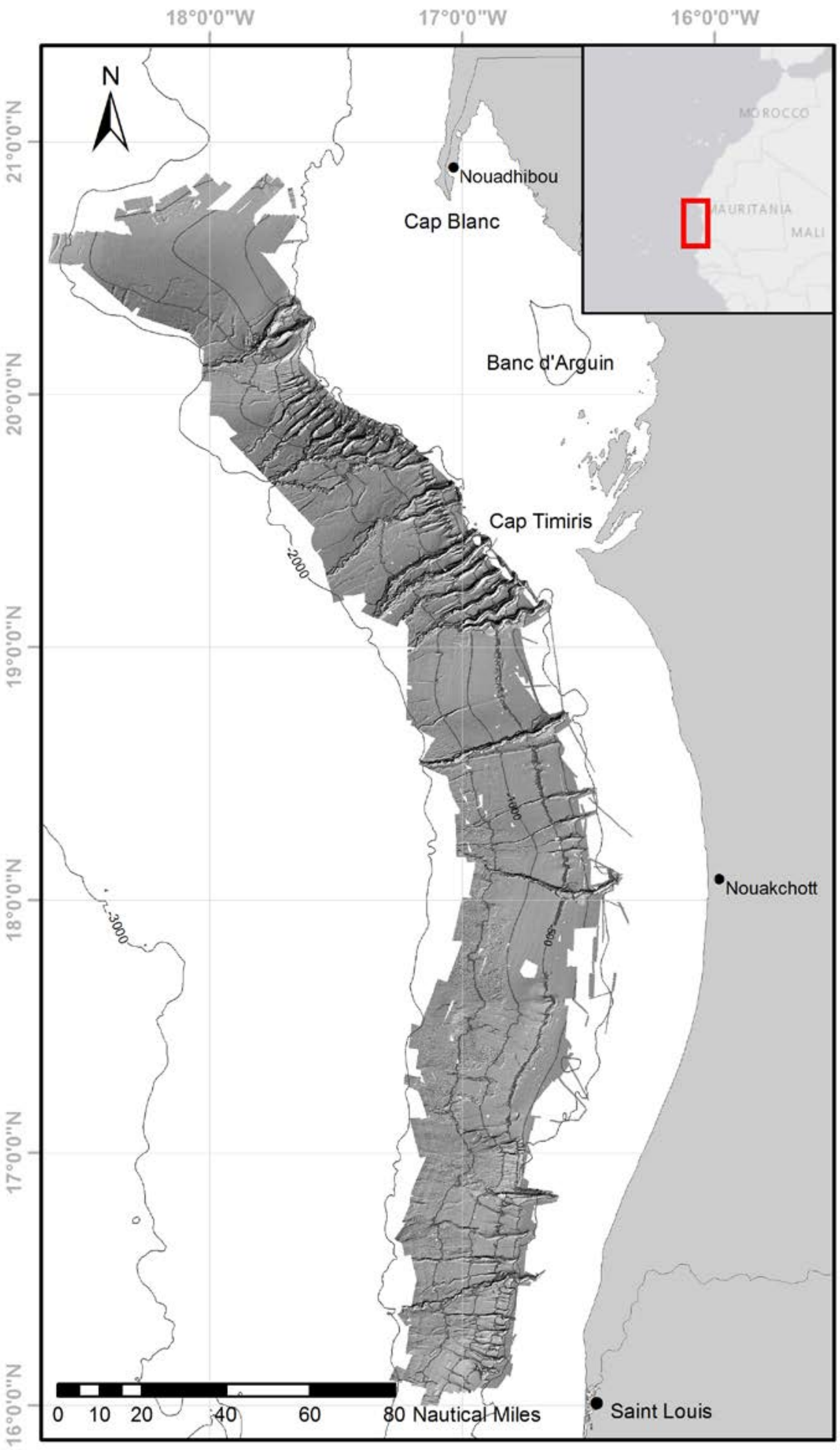
- Caracterización de la estructura, composición y distribución de las comunidades de decápodos en el área de estudio en base a los datos de abundancia y biomasa y de los factores medioambientales obtenidos en las campañas.

ÁREA DE ESTUDIO

El área de estudio incluyó la plataforma profunda y talud continental de Mauritania, desde la latitud de Cabo Blanco (20°50'N) en el norte hasta la desembocadura del río Senegal (16°04'N) en el sur. Los muestreos se han realizado a profundidades comprendidas entre 80 y 2000 m.

La totalidad del área muestreada se prospectó mediante una ecosonda multihaz que ha permitido obtener una cartografía detallada de la zona (Sanz y Agudo-Bravo, en evaluación), lo que convierte el margen continental mauritano en el mejor conocido de toda la región del noroeste africano (Agudo-Bravo y Mangas, 2015). La plataforma continental presenta una anchura media que oscila entre 30 y 50 km, pero que llega a alcanzar los 140 km en la zona del banco de Arguin. La rotura de plataforma se sitúa entre los 150–200m de profundidad y la base del talud continental a unos 2500 m.

La mayor parte de de los fondos están ocupados por sedimentos fangosos, afectados por grandes deslizamientos debido a la inestabilidad del talud. Además, las zonas de deslizamientos aparecen cortadas por importantes sistemas de cañones submarinos, entre los que cabe destacar los del banco de Arguin y cabo Timiris, el cañón de Inchiri, los situados frente a Nouakchott y los asociados al río Senegal en la zona sur de Mauritania (Mapa 1). Asimismo se ha localizado un arrecife de corales de aguas frías a 500 m de profundidad, con una altura media de 100 m sobre el fondo y una anchura de unos 1700 m. Esta barrera corre paralela a la línea de costa a lo largo de 405 km, entre el cabo Tímiris y el río Senegal. Finalmente, al sur de Nouakchott y a unas 40 millas náuticas de la costa (17º08'50"N–16º46'38.1"O) se descubrió una montaña submarina durante la campaña *Maurit-0911*, de unos 200 m de altura. Su base se sitúa en el talud superior a 350–400 m de profundidad y está completamente aislada del arrecife de coral. Consiste en una estructura alargada, más o menos paralela al borde continental, de unos 6,3 km de largo por 1,9 km de ancho en la que existen áreas rocosas libres de sedimento.



Mapa 1. Geomorfología del área de estudio

MATERIAL Y MÉTODOS

LAS CAMPAÑAS

Entre los años 2007 y 2010 el Instituto Español de Oceanografía, en el marco de la cooperación con el Institut Mauritanien de Recherches Océanographiques et des Pêches (IMROP) y en colaboración con la Universidad de Vigo desarrolló cuatro campañas multidisciplinares en aguas de la ZEE de Mauritania (*Maurit-1107*, *Maurit-0811*, *Maurit-0911* y *Maurit-1011*). Uno de los objetivos de estas campañas fue el estudio de los invertebrados bentónicos recogidos, tanto fauna acompañante en las pescas de arrastre como mediante aparejos específicos para el muestreo del bentos.

Buque

Las campañas se realizaron a bordo del B/O *Vizconde de Eza*, buque de investigación español perteneciente a la Secretaría General del Mar (Ministerio de Medio Ambiente, Medio Rural y Marino). El barco tiene 53 m de eslora, 13 de manga, un tonelaje de registro bruto de 1400 GT, propulsión diésel eléctrica con una potencia de 1.800 kW, alcanza una velocidad máxima de 13 nudos, tiene una autonomía de 40-50 días y está equipado con dos chigres de pesca con capacidad de arrastre hasta 2000 m de profundidad. La dotación está compuesta por 19 tripulantes y tiene capacidad para 16 científicos y técnicos. Además cuenta con 6 laboratorios especializados (Biología, Química, Acústica, Física, Informática y Húmedo) y parque de pesca para la separación, cuantificación y procesado de las muestras.

TRABAJOS EN EL MAR

Aparejos

Dada la heterogeneidad del margen continental mauritano y el enfoque multidisciplinar de las campañas, se han empleado diferentes artes de arrastre para el muestreo de la fauna demersal y bentónica.

- Un aparejo de arrastre comercial tipo Lofoten de 17,7 m y 5,5 m de aberturas horizontal y vertical y copo con malla de 35 mm. El arte estaba provisto de 250 m de malletas, iba armado con un tren de diávolos de acero de 14” y 32 cm de diámetro y flotadores de alta resistencia de 240 mm de diámetro, específicos para grandes profundidades. Las puertas de arrastre eran de tipo oval, con un peso de 850 kg cada una (Figs. 1A-C). Este aparejo empleado normalmente para la prospección y evaluación de los recursos pesqueros demersales captura también numerosos invertebrados pertenecientes a la epifauna megabentónica.

- Un arte de arrastre tipo bou de vara, con abertura horizontal de 3,5 m y vertical de 0,7 m, copo externo de malla de 30 mm y otro interno de 10 mm, provisto de una parpalla inferior de protección que evitaba la abrasión de la red contra el fondo (Fig. 1E). El bou de vara es un muestreador específico para la captura del epibentos, cuya efectividad en el muestreo de la macrofauna, y en particular de invertebrados de pequeño tamaño, es superior a la del arrastre comercial.

- El tercer muestreador empleado fue una draga de roca, con marco metálico de 1,10 m y 0,80 m de aberturas horizontal y vertical respectivamente, provisto de un copo con red de malla de 10 mm y dos faldones de cuero que lo protegen (Fig. 1D). Este muestreador se emplea normalmente en fondos rocosos y otros tipos de hábitats que por su naturaleza no son accesible mediante aparejos de arrastre convencionales.

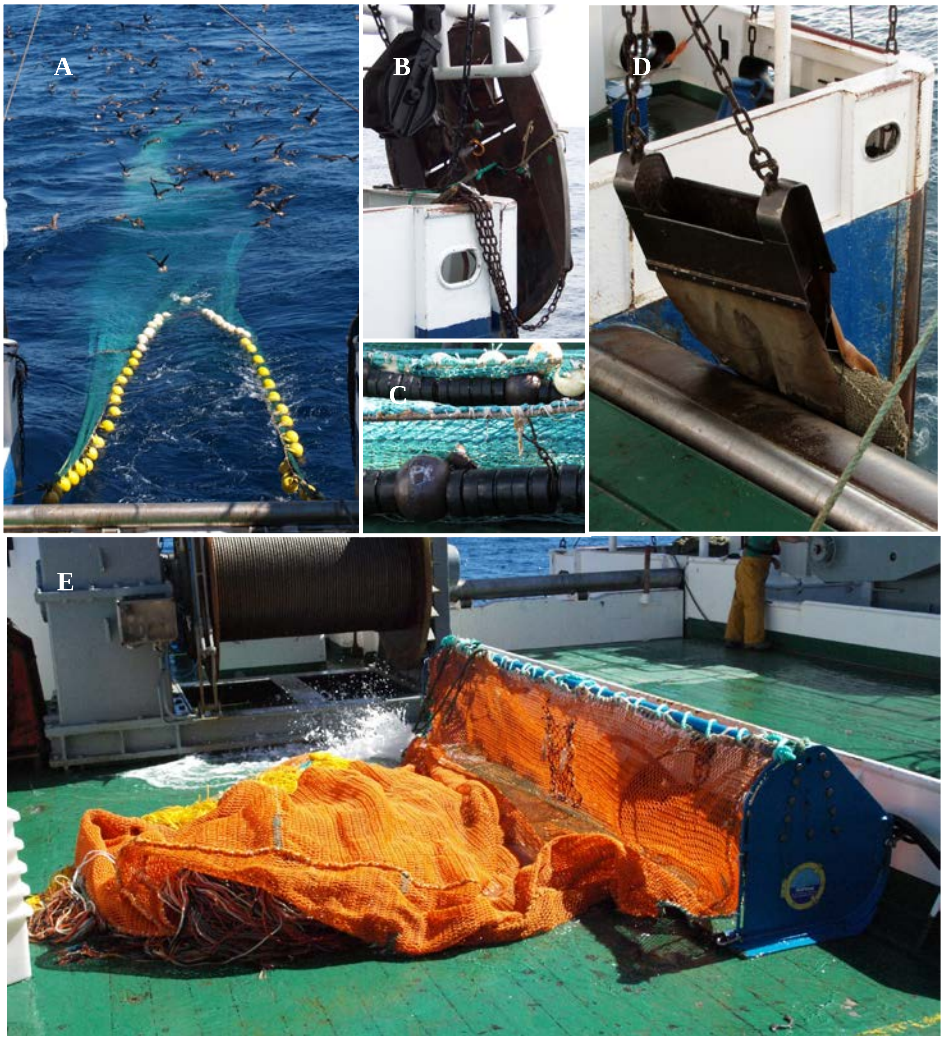


Fig. 1. Aparejos de muestreo. Arrastre comercial: A) vista general B) puerta C) tren de diávolos, detalle; D) Draga de roca; E) Bou de vara

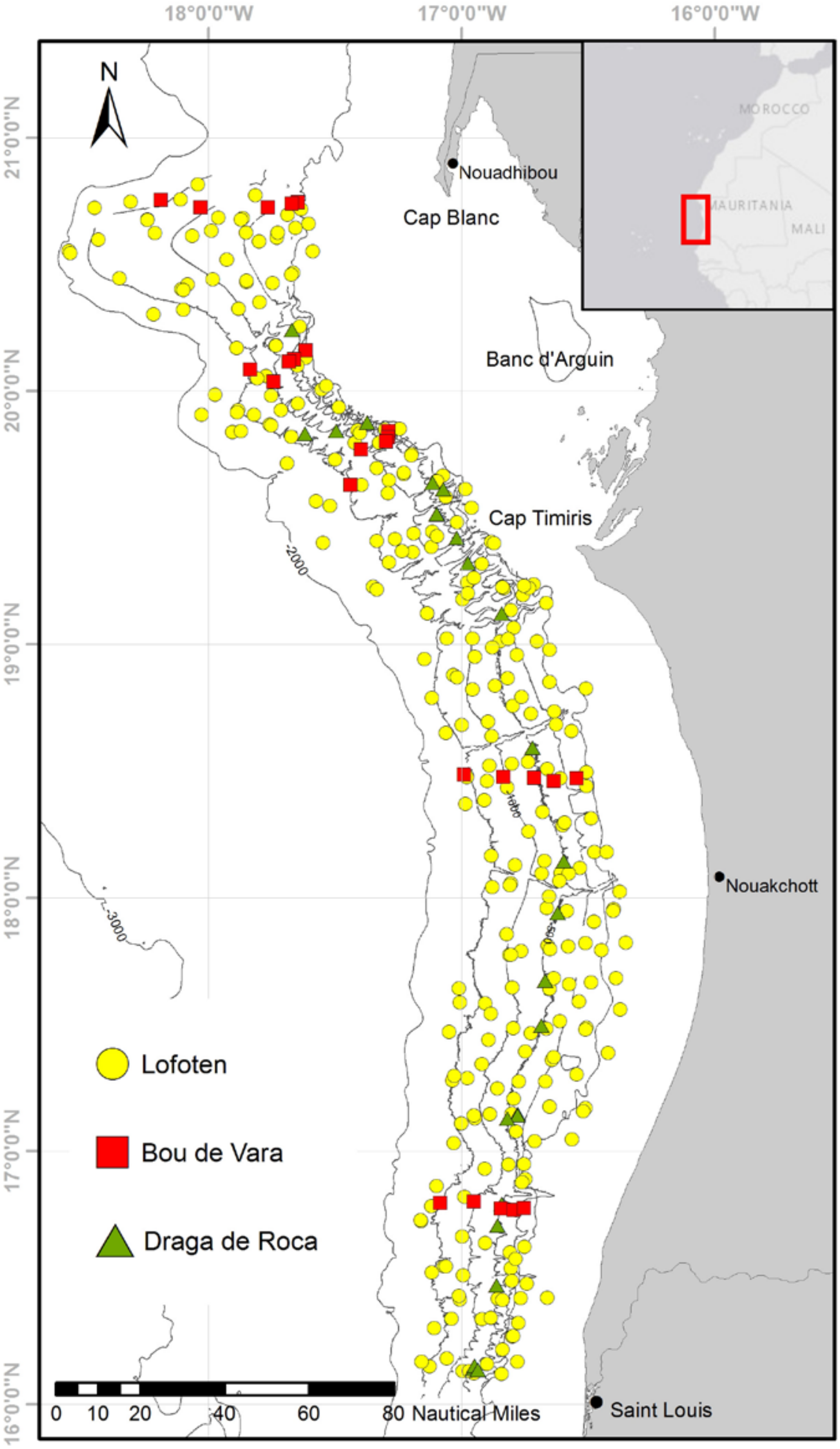
Metodología de muestreo

La selección de estaciones se realizó siguiendo metodologías diferentes según el arte empleado.

- Los muestreos con el aparejo comercial se realizaron siguiendo el método del área barrida y muestreo estratificado aleatorio. Se establecieron cuadrículas de 10”x10” como unidad básica de muestreo y se llevó a cabo una estratificación latitudinal y batimétrica. En este sentido el área de muestreo se dividió en tres zonas geográficas: Norte (20º50’N-19º23’N), Centro (19º23’N-17º40’N) y Sur (17º40’N-16º04’N), y seis estratos batimétricos: dos costeros (80-200 m y 200-400 m) y cuatro profundos (400- 800 m, 800-1200 m, 1200-1500 m y 1500-2000). Los arrastres se realizaron a una velocidad media de 3 nudos y el tiempo de arrastre efectivo en el fondo varió en función del estrato muestreado: 30 minutos en los costeros (< 400 m) y 60 minutos en los profundos (> 400 m). Los arrastres se monitorizaron mediante sensores situados en las puertas y en la red, lo que permitió conocer el tiempo de permanencia en el fondo; estos datos se emplearon posteriormente para calcular el área barrida.
En las cuatro campañas *Maurit* se efectuaron un total de 291 arrastres con este arte comercial, de los cuales 283 se consideraron válidos (Mapa 2).

- Los muestreos con bou de vara se realizaron en cinco transectos perpendiculares a la línea de costa, situados más o menos equidistantes a lo largo de toda la costa mauritana. En cada transecto las muestras se recogieron en cinco estratos batimétricos a 150, 300, 500, 1000 y 1500 m de profundidad. En este caso la velocidad de arrastre fue de 2 nudos y el tiempo de arrastre efectivo de 15 minutos. El bou de vara iba provisto de un sensor de red que indicaba el tiempo que el aparejo permanecía en el fondo, permitiendo así calcular el área barrida.
Con este arte se efectuaron un total de 25 arrastres durante las campañas *Maurit-0911* y *Maurit-1011*, todos ellos considerados válidos (Mapa 2).

- La draga de roca se utilizó en las campañas *Maurit-0911* y *Maurit-1011* para tomar muestras en aquellas zonas en las que la presencia de fondos duros desaconsejaron la utilización de los otros muestreadores. Así, se realizaron 13 muestreos sobre la barrera de coral, 11 en los cañones de la zona del Banco de Arguin y Cabo Timiris, y dos sobre la montaña submarina descubierta durante la campaña *Maurit 0911*. En este caso la velocidad de arrastre fue de 1 nudo y el tiempo efectivo en el fondo de 5 minutos. Todos los muestreos excepto uno sobre la montaña fueron válidos (Mapa 2).



Mapa 2. Area de estudio mostrando la localización de las estaciones muestreadas y el aparejo empleado

Para cada estación de muestreo se registraron los datos correspondientes al tipo de arte empleado, código, fecha, zona, estrato, posición de las operaciones de largada y virada (hora, coordenadas y profundidad), a la maniobra del arrastre (cable largado, rumbo, velocidad), datos meteorológicos e incidencias. En todos los casos la posición geográfica de los arrastres fue registrada utilizando un sistema de posicionamiento global (GPS). Los datos de cada una de las estaciones referentes a sus coordenadas geográficas, profundidad y naturaleza del sustrato se incluyen en el Anexo I de esta memoria.

Procesado de las muestras a bordo

Las muestras recogidas con el arrastre comercial se separaron manualmente en el parque de pesca, prestando especial atención a los invertebrados de pequeño tamaño que pudieran pasar desapercibidos. Siempre que fue posible se separó el total de la captura, pero en aquellos casos en los que su elevado volumen no permitía la separación total, se separó una submuestra, siendo los resultados posteriormente extrapolados al total de la captura.

Las muestras recogidas con bou de vara y draga de roca se lavaron a través de una torre de tamices de luz de malla decreciente (10, 5 y 1 mm) con objeto de eliminar el sedimento, facilitando así la separación de la fauna.

Todas las muestras se separaron en primer lugar en grandes grupos (filo, clase, orden) y posteriormente se abordó una separación más detallada. En el caso de los crustáceos decápodos las muestras se separaron a nivel de morfoespecies, obteniéndose, además, datos de abundancia (número de individuos) y biomasa (peso fresco) para cada una de ellas. Seguidamente todas las especies de cada muestra fueron fotografiadas en fresco, incluyendo tanto fotografías generales de los ejemplares completos, como algunos detalles de su anatomía externa. Finalmente se seleccionó una muestra representativa de cada especie, a las que se le asignó un código identificativo y se conservaron en alcohol al 70% convenientemente etiquetadas.

Los datos faunísticos fueron informatizados a bordo para su posterior análisis, tras la identificación definitiva de las especies en el laboratorio.

Estudio geomorfológico y muestreo de la columna de agua

Teniendo en cuenta el carácter multidisciplinar de las campañas *Maurit*, además de los muestreos biológicos, también se desarrollaron de forma paralela una serie de estudios geomorfológicos y oceanográficos en la zona.

Las prospecciones geomorfológicas se realizaron mediante ecosondas multihaz y sísmica de alta resolución (TOPAS) a la vez que se obtuvieron muestras de sedimento mediante un cilindro metálico acoplado a la red de arrastre. Estos trabajos han permitido obtener una cartografía detallada y completar la caracterización geomorfológica y sedimentaria de los fondos marinos de Mauritania entre 80 y 2000 m de profundidad (Sanz y Agudo, en evaluación).

El estudio de las propiedades físico-químicas (temperatura, salinidad, fluorescencia y oxígeno) en la columna de agua y el fondo marino durante los arrastres se realizó utilizando una batisonda CTD modelo Sea-Bird 25 y un CTD de red modelo Sea-Bird 37-SM Micro CAT. Los datos hidrográficos han sido procesados y analizados al objeto de caracterizar las masas de agua que bañan las costas de Mauritania (Meiners et al., en evaluación).

TRABAJOS DE GABINETE

Estudio taxonómico

Los decápodos se caracterizan principalmente por presentar la cabeza y el tórax fusionados en un cefalotórax que se expande lateralmente para cubrir las branquias, y por la especialización para la manipulación de los alimentos de los tres primeros pares de patas torácicas (maxilípedos), que pierden así su función locomotora. Sin embargo, no existe un patrón morfológico general y los decápodos presentan diferentes modelos corporales, asociados en gran medida a su modo de vida. La identificación específica se basa fundamentalmente en el estudio de su morfología externa y en especial de determinados apéndices, aunque la relevancia de los diferentes caracteres taxonómicos varía de unos grupos a otros. Un breve resumen con descripciones y esquemas de los caracteres más utilizados en la determinación taxonómica se puede encontrar en Zariquiey-Álvarez (1968) para los decápodos en general, en Baba (2005) para quirostiloideos y galateoideos, en Ingle (1993) y Lemaitre (1989) para cangrejos ermitaños, en González-Gurriarán y Méndez (1986) para braquiuros, en Dworschak et al. (2012) para talasinídeos, en Macpherson (1988) para los litódidos, en Holthuis (1987) y Pérez-Farfante & Kensley (1997) para dendrobranquiados y carídeos, y en Holthuis (1985, 1991) y Galil (2000) para macruros reptantes.

El estudio taxonómico se ha llevado a cabo en el laboratorio de Zoología Marina de la Facultad de Ciencias del Mar de la Universidad de Vigo.

Una vez que las colecciones llegaron al laboratorio se abordó en primer lugar, la revisión de las muestras, la sustitución de los líquidos conservantes y el reetiquetado siempre que fue necesario.

La identificación específica se realizó con la ayuda de un microscopio estereoscópico WILD Heerbrugg y de la bibliografía especializada correspondiente.

Para la identificación de algunas especies fue necesario recurrir al estudio del material tipo, como en el caso de los ermitaños Areopaguristes mauritanicus (Bouvier, 1906) y Pseudopaguristes marocanus (A. Milne-Edwards & Bouvier, 1891) depositado en Museo de Historia Natural de Paris. En otros casos hemos recurrido a la revisión de material de comparación depositado en las Colecciones Biológicas de Referencia del Instituto de Ciencias del Mar-Consejo Superior de Investigaciones Científicas, Barcelona, en la Colección de Crustáceos Decápodos y Estomatópodos del Centro Oceanográfico de Cádiz (CCDE-IEOCD) y en la Colección de

Referencia del laboratorio de Zoología Marina de la Facultad de Ciencias del Mar (Universidad de Vigo).

Una vez identificadas las especies, se obtuvieron biometrías de todos los especímenes examinados así como datos relacionados con el sexo y la presencia de hembras ovadas y juveniles.

Las fotografías de detalle se realizaron en el laboratorio con una cámara digital acoplada a un microscopio estereoscópico Nikon SMZ25, motorizado e informatizado mediante el programa NIS-Elements Microscope Imaging, que incorpora el complemento EDF (Extended Depth of Focus).

Análisis estadístico

El último de los trabajos incluidos en esta memoria utiliza el paquete estadístico PRIMER 6.0 (Clarke y Warwick, 2001) para la caracterización de las comunidades de crustáceos decápodos y la evaluación de la influencia de los parámetros medioambientales y geográficos en los patrones de distribución de las mismas. Las matrices de abundancias (número de individuos) y biomasas (peso en kg) por especie y estación se estandarizaron a 0.1 km^2.

Se aplicaron técnicas de clustering y escalado multidimensional (MDS) a la matriz de similaridad obtenida tras la transformación de los datos de abundancia (doble raíz cuadrada) e índice de Bray-Curtis (Clifford y Stephenson, 1975)

La significancia de las similaridades entre los diferentes grupos se evaluó mediante un análisis de varianza (ANOSIM) (Clarke y Warwick, 2001). La contribución de las distintas especies a la similaridad dentro de cada comunidad (especies típicas) y a la disimilaridad entre las mismas (especies discriminatorias) se analizó mediante el programa SIMPER. Para conocer la estructura y composición de las comunidades se calcularon los indicadores ecológicos (abundancia, biomasa, frecuencia, riqueza específica e índice de Shanon-Wiener), y se jerarquizaron las principales especies según su abundancia, biomasa y frecuencia de aparición.

La influencia de los parámetros medioambientales (profundidad, latitud, longitud, temperatura del fondo, contenido en materia orgánica, carbonatos y tamaño de grano del sedimento) en los patrones de distribución de las comunidades de decápodos se analizaron aplicando el método BIOENV.

COLECCIONES FAUNÍSTICAS

El material estudiado se depositará en las colecciones del Instituto Español de Oceanografía en Cádiz (Colección de Crustáceos Decápodos y Estomatópodos del Centro Oceanográfico de Cádiz, CCDE-IEOCD) y Málaga (Colección de Fauna Marina del Centro Oceanográfico de Málaga). Asimismo se depositará una colección de referencia en el laboratorio de Zoología Marina de la Facultad de Ciencias del Mar (Universidad de Vigo).

Los holotipos de las especies nuevas para la ciencia descritas durante el desarrollo de los trabajos presentados en esta memoria se han depositado en el Museo Nacional de Ciencias Naturales de Madrid. Un paratipo de la especie del cangrejo ermitaño *Paguristes candelae* S. de Matos-Pita y Ramil, 2015, se conserva en la colección del Laboratorio de Zoología Marina de la Universidad de Vigo.

RESULTADOS

CATÁLOGO DE ESPECIES

A continuación se relacionan las 132 especies de crustáceos decápodos identificados durante este estudio. La ordenación sistemática adoptada hasta el nivel de familia se corresponde, en general, con la propuesta por Ahyong et al. (2011), aunque en el caso de quirostiloideos se sigue la de Schnabel y Ahyong (2010), para galateoideos la de Ahyong et al. (2010) y para los Callianassidea (talasinídeos) se adopta la propuesta por Sakai et al. (2015).

La asignación de géneros a familias se basa en los trabajos de De Grave y Fransen (2011) para dendrobraquiados y carídeos; en Chan (2010) para los astacídeos, aquelados y poliquélidos; en el de McLaughlin et al. (2010) para cangrejos ermitaños y litódidos y en el trabajo de De Grave et al. (2009) para los braquiuros.

Subfilo CRUSTACEA Brünnich, 1772
Clase MALACOSTRACA Latreille, 1802
Subclase EUMALACOSTRACA Grobben, 1892
Superorden EUCARIDA Calman, 1904

Orden DECAPODA Latreille, 1803

Suborden **DENDROBRANCHIATA** Bate, 1888

Superfamilia PENAEOIDEA Rafinesque, 1815
Familia ARISTEIDAE Wood-Mason en Wood-Mason & Alcock, 1891
Género *Aristaeomorpha* Wood-Mason en Wood-Mason & Alcock, 1891
Aristaeomorpha foliacea (Risso, 1827)
Género *Aristaeopsis* Wood-Mason en Wood-Mason & Alcock, 1891
Aristaeopsis edwardsiana (Johnson, 1868)
Género *Aristeus* Duvernoy, 1840
Aristeus antennatus (Risso, 1816)
Aristeus varidens Holthuis, 1952
Familia BENTHESICYMIDAE Wood-Mason en Wood-Mason & Alcock, 1891
Género *Benthesicymus* Spence Bate, 1881
Benthesicymus bartletti Smith, 1882
Familia PENAEIDAE Rafinesque, 1815
Género *Farfantepenaeus* Burukovsky, 1997
Farfantepenaeus notialis (Pérez Farfante, 1967)

Género *Funchalia* Johnson, 1868
Funchalia danae Burkenroad, 1940
Género *Metapenaeopsis* Bouvier, 1905
Metapenaeopsis miersi (Holthuis, 1952)
Género *Parapenaeus* Smith, 1885
Parapenaeus longirostris (Lucas, 1846)
Género *Pelagopenaeus* Pérez Farfante & Kensley, 1997
Pelagopenaeus balboae (Faxon, 1893)
Familia SICYONIIDAE Ortmann, 1898
Género *Sicyonia* H. Milne Edwards, 1830
Sicyonia galeata Holthuis, 1952
Familia SOLENOCERIDAE Wood-Mason en Wood-Mason & Alcock, 1891
Género *Hymenopenaeus* Smith, 1882
Hymenopenaeus chacei Crosnier & Forest, 1969
Género *Solenocera* Lucas, 1849
Solenocera africana Stebbing, 1917
Superfamilia SERGESTOIDEA Dana, 1852
Familia SERGESTIDAE Dana, 1852
Género *Eusergestes* Judkins & Kensley, 2008
Eusergestes arcticus (Krøyer, 1855)
Género *Sergia* Stimpson, 1860
Sergia grandis (Sund, 1920)
Sergia robusta (Smith, 1882)
Sergia talismani (Barnard, 1947)

Suborden **PLEOCYEMATA** Burkenroad, 1963

Infraorden CARIDEA Dana, 1852
Superfamilia ALPHEOIDEA Rafinesque, 1815
Familia ALPHEIDAE Rafinesque, 1815
Género *Alpheus* Fabricius, 1798
Alpheus macrocheles (Hailstone, 1835b)
Alpheus talismani Coutière, 1898
Familia HIPPOLYTIDAE Dana, 1852
Género *Lebbeus* White, 1847
Lebbeus africanus Fransen, 1997
Superfamilia CRANGONOIDEA Haworth, 1825
Familia CRANGONIDAE Haworth, 1825
Género *Aegaeon* Agassiz, 1846
Aegaeon cataphractus (Olivi, 1792)
Aegaeon lacazei (Gourret, 1887)

Género *Metacrangon* Zarenkov, 1965
Metacrangon bellmarleyi (Stebbing, 1914)
Metacrangon jacqueti (A. Milne-Edwards, 1881)
Género *Parapontophilus* Christoffersen, 1988
Parapontophilus gracilis gracilis (Smith, 1882)
Género *Sabinea* Ross, 1835
Sabinea hystrix (A. Milne-Edwards, 1881)
Familia GLYPHOCRANGONIDAE Smith, 1884
Género *Glyphocrangon* A. Milne-Edwards, 1881
Glyphocrangon longirostris (Smith, 1882)
Superfamilia NEMATOCARCINOIDEA Smith, 1884
Familia NEMATOCARCINIDAE Smith, 1884
Género *Nematocarcinus* A. Milne-Edwards, 1881
Nematocarcinus africanus Crosnier & Forest, 1973
Nematocarcinus ensifer (Smith, 1882)
Superfamilia OPLOPHOROIDEA Dana, 1852
Familia ACANTHEPHYRIDAE Dana, 1852
Género *Acanthephyra* A. Milne-Edwards, 1881
Acanthephyra acanthitelsonis Spence Bate, 1888
Acanthephyra curtirostris Wood-Mason & Alcock, 1891
Acanthephyra eximia Smith, 1884
Acanthephyra pelagica (Risso, 1816)
Género *Ephyrina* Smith, 1885
Ephyrina figueirai figueirai Crosnier & Forest, 1973
Género *Notostomus* A. Milne-Edwards, 1881
Notostomus crosnieri Macpherson, 1984
Familia OPLOPHORIDAE Dana, 1852
Género *Oplophorus* H. Milne Edwards, 1837 [en H. Milne Edwards, 1834-1840]
Oplophorus spinosus (Brullé, 1839)
Género *Systellaspis* Spence Bate, 1888
Systellaspis cristata (Faxon, 1893)
Systellaspis debilis (A. Milne-Edwards, 1881)
Systellaspis pellucida (Filhol, 1884)
Superfamilia PANDALOIDEA Haworth, 1825
Familia PANDALIDAE Haworth, 1825
Género *Heterocarpus* A. Milne-Edwards, 1881
Heterocarpus ensifer A. Milne-Edwards, 1881
Heterocarpus grimaldii A. Milne-Edwards & Bouvier, 1900

Género *Plesionika* Spence Bate, 1888
Plesionika acanthonotus (Smith, 1882)
Plesionika brevipes (Crosnier & Forest, 1968)
Plesionika carinata Holthuis, 1951
Plesionika edwardsii (Brandt, 1851)
Plesionika ensis (A. Milne-Edwards, 1881)
Plesionika heterocarpus (A. Costa, 1871)
Plesionika martia (A. Milne-Edwards, 1883)
Plesionika narval (Fabricius, 1787)
Superfamilia PASIPHAEOIDEA Dana, 1852
Familia PASIPHAEIDAE Dana, 1852
Género *Glyphus* Filhol, 1884
Glyphus marsupialis Filhol, 1884
Género *Parapasiphae* Smith, 1884
Parapasiphae sulcatifrons Smith, 1884
Género *Pasiphaea* Savigny, 1816
Pasiphaea ecarina Crosnier, 1969
Pasiphaea multidentata Esmark, 1866
Pasiphaea semispinosa Holthuis, 1951
Pasiphaea tarda Krøyer, 1845
Género *Psathyrocaris* Wood-Mason en Wood-Mason & Alcock, 1893
Psathyrocaris fragilis Wood-Mason en Wood-Mason & Alcock, 1893
Superfamilia PROCESSOIDEA Ortmann, 1890
Familia PROCESSIDAE Ortmann, 1890
Género *Processa* Leach, 1815 [en Leach, 1815-1875]
Processa nouveli Al-Adhub & Williamson, 1975

Infraorden ASTACIDEA Latreille, 1802
Superfamilia NEPHROPOIDEA Dana, 1852
Familia NEPHROPIDAE Dana, 1852
Género *Nephropsis* Wood-Mason, 1872
Nephropsis atlantica Norman, 1882

Infraorden ACHELATA Scholtz & Richter, 1995
Familia PALINURIDAE Latreille, 1802
Género *Palinurus* Weber, 1795
Palinurus mauritanicus Gruvel, 1911

Familia SCYLLARIDAE Latreille, 1825
Subfamilia Scyllarinae Latreille, 1825
Género *Scyllarus* Fabricius, 1775
Scyllarus caparti Holthuis, 1952
Scyllarus subarctus Crosnier, 1970

Infraorden POLYCHELIDA Scholtz & Richter, 1995
Familia POLYCHELIDAE Wood-Mason, 1875
Género *Polycheles* Heller, 1862
Polycheles typhlops Heller, 1862
Género *Stereomastis* Bate, 1888
Stereomastis nana (Smith, 1884)
Stereomastis sculpta (Smith, 1880)
Stereomastis talismani (Bouvier, 1917)

Infraorden CALLIANASSIDEA Dana 1852
Superfamilia AXIOIDEA Huxley 1879
Familia AXIIDAE Huxley, 1879
Género *Calocarides* Wollebaek, 1908
Calocarides coronatus (Trybom, 1904)
Género *Ezaxius* S. de Matos-Pita & Ramil, 2015
Ezaxius ferachevali S. de Matos-Pita & Ramil, 2015
Familia CALOCARIDIDAE Ortmann 1891
Género *Calocaris* Bell 1846
Calocaris macandreae Bell 1846
Superfamilia CALLIANASSOIDEA Dana 1852
Familia CALLIANASSIDAE Dana 1852
Género *Trypaea* Dana, 1852 (sensu Sakai 2011)
Trypaea oblonga (Le Loeuff e Intes, 1974)

Infraorden ANOMURA MacLeay, 1838
Superfamilia CHIROSTYLOIDEA Ortmann, 1892
Familia EUMUNIDIDAE A. Milne Edwards & Bouvier, 1900
Género *Eumunida* Smith, 1883
Eumunida bella de Saint Laurent & Macpherson, 1990
Superfamilia GALATHEOIDEA Samouelle, 1819
Familia GALATHEIDAE Samouelle, 1819
Género *Galathea* Fabricius, 1793
Galathea wolffi Miyake & Baba, 1970

Familia MUNIDIDAE Ahyong, Baba, Macpherson, Poore, 2010
Género *Munida* Leach, 1820
Munida guineae Miyake & Baba, 1970
Munida intermedia A. Milne Edwards & Bouvier, 1899
Munida sanctipauli Henderson, 1885
Munida speciosa von Martens, 1878
Familia MUNIDOPSIDAE Ortmann, 1898
Género *Munidopsis* Whiteaves, 1874
Munidopsis anaramosae S. de Matos-Pita & Ramil, 2014
Munidopsis chunii Balss, 1913
Munidopsis curvirostra Whiteaves, 1874
Munidopsis serricornis (Lovén, 1852)
Munidopsis vaillantii (A. Milne Edwards, 1881)
Superfamilia PAGUROIDEA Latreille, 1802
Familia DIOGENIDAE Ortmann, 1892
Género *Areopaguristes* Rahayu & McLaughlin, 2010
Areopaguristes mauritanicus (Bouvier, 1906)
Género *Dardanus* Paul'son, 1875
Dardanus arrosor (Herbst, 1796)
Género *Diogenes* Dana, 1851
Diogenes pugilator (Roux, 1829)
Género *Paguristes* Dana, 1851
Paguristes candelae S. de Matos-Pita & Ramil, 2015
Género *Pseudopaguristes* McLaughlin, 2002
Pseudopaguristes marocanus (A. Milne-Edwards & Bouvier, 1891)
Familia PAGURIDAE Latreille, 1802
Género *Anapagurus* Henderson, 1886
Anapagurus laevis (Bell, 1846)
Género *Pagurus* Fabricius, 1775
Pagurus alatus Fabricius, 1775
Pagurus cuanensis Bell, 1846
Pagurus prideaux Leach, 1815
Pagurus pubescentulus (A. Milne-Edwards & Bouvier, 1892)
Familia PARAPAGURIDAE Smith, 1882
Género *Paragiopagurus* Lemaitre, 1996
Paragiopagurus macrocerus (Forest, 1955)
Género *Parapagurus* Smith, 1879
Parapagurus nudus (A. Milne-Edwards, 1891)
Parapagurus pilosimanus Smith, 1879

Superfamilia LITHODOIDEA Samouelle, 1819
Familia LITHODIDAE Samouelle, 1819
Género *Lithodes* Latreille, 1806
Lithodes ferox Filhol, 1885
Género *Neolithodes* A. Milne-Edwards & Bouvier, 1894
Neolithodes asperrimus Barnard, 1947
Neolithodes grimaldii (A. Milne-Edwards & Bouvier, 1894)
Género *Paralomis* White, 1856
Paralomis cristulata Macpherson, 1988
Paralomis erinacea Macpherson, 1988

Infraorden BRACHYURA Latreille, 1802
Sección DROMIACEA de Haan, 1833
Superfamilia HOMOLOIDEA de Haan, 1839
Familia HOMOLIDAE de Haan, 1839
Género *Homola* Leach, 1815
Homola barbata (Fabricius, 1793)
Género *Paromola* Wood-Mason & Alcock, 1891
Paromola cuvieri (Risso, 1816)
Sección CYCLODORIPPOIDA Ahyong et al., 2007
Superfamilia CYCLODORIPPOIDEA Ortmann, 1892
Familia CYMONOMIDAE Bouvier, 1897
Género *Cymonomus* A. Milne-Edwards, 1880
Cymonomus granulatus (Norman, en Thomson, 1873)
Sección EUBRACHYURA de Saint Laurent, 1980
Subsección HETEROTREMATA Guinot, 1977
Superfamilia CALAPPOIDEA H. Milne-Edwards, 1837
Familia CALAPPIDAE H. Milne-Edwards, 1837
Género *Acanthocarpus* Stimpson, 1871
Acanthocarpus brevispinis Monod, 1946
Género *Calappa* Weber, 1795
Calappa pelii Herklots, 1851
Superfamilia CANCROIDEA Latreille, 1802
Familia ATELECYCLIDAE Ortmann, 1893
Género *Atelecyclus* Leach, 1814
Atelecyclus rotundatus (Olivi, 1792)
Superfamilia DORIPPOIDEA MacLeay, 1838
Familia DORIPPIDAE MacLeay, 1838
Género *Medorippe* Manning & Holthuis, 1981
Medorippe lanata (Linnaeus, 1767)

Familia ETHUSIDAE Guinot, 1977
Género *Ethusa* Roux, 1830
Ethusa rosacea A. Milne-Edwards & Bouvier, 1897
Ethusa rugulosa A. Milne-Edwards & Bouvier, 1897
Superfamilia GONEPLACOIDEA MacLeay, 1838
Familia GONEPLACIDAE MacLeay, 1838
Género *Goneplax* Leach, 1814
Goneplax barnardi (Capart, 1951)
Goneplax rhomboides (Linnaeus, 1758)
Familia MATHILDELLIDAE Karasawa & Kato, 2003
Género *Neopilumnoplax* Serène in Guinot, 1969
Neopilumnoplax corallicola S. de Matos-Pita & Ramil, 2015
Superfamilia LEUCOSIOIDEA Samouelle, 1819
Familia LEUCOSIIDAE Samouelle, 1819
Género *Ebalia* Leach, 1817
Ebalia nux Norman en A. Milne-Edwards, 1883
Género *Pseudomyra* Capart, 1951
Pseudomyra mbizi Capart, 1951
Superfamilia MAJOIDEA Samouelle, 1819
Familia EPIALTIDAE MacLeay, 1838
Género *Pisa* Leach, 1814
Pisa armata (Latreille, 1803)
Familia INACHIDAE MacLeay, 1838
Género *Inachus* Weber, 1795
Inachus aguiarii Brito Capello, 1876
Inachus angolensis Capart, 1951
Inachus grallator Manning & Holthuis, 1981
Inachus leptochirus Leach, 1817
Inachus nanus Manning & Holthuis, 1981
Género *Macropodia* Leach, 1814
Macropodia gilsoni (Capart, 1951)
Macropodia hesperiae Manning & Holthuis, 1981
Macropodia longipes (A. Milne-Edwards & Bouvier, 1899)
Macropodia macrocheles (A. Milne-Edwards & Bouvier, 1898)
Familia MAJIDAE Samouelle, 1819
Género *Eurynome* Leach, 1814
Eurynome aspera (Pennant, 1777)

Superfamilia PARTHENOPOIDEA MacLeay, 1838
Familia PARTHENOPIDAE MacLeay, 1838
Género *Distolambrus* S. H. Tan & Ng, 2007
Distolambrus maltzami (Miers, 1881)
Género *Solenolambrus* Stimpson, 1871
Solenolambrus noordendei (Capart, 1951)
Género *Spinolambrus* S. H. Tan & Ng, 2007
Spinolambrus notialis (Manning & Holthuis, 1981)
Superfamilia PORTUNOIDEA Rafinesque, 1815
Familia CARCINIDAE MacLeay, 1838
Género *Liocarcinus* Stimpson, 1871
Liocarcinus corrugatus (Pennant, 1777)
Familia GERYONIDAE Colosi, 1923
Género *Chaceon* Manning & Holthuis, 1989
Chaceon maritae (Manning & Holthuis, 1981)
Familia MACROPIPIDAE Stephenson & Campbell, 1960
Género *Bathynectes* Stimpson, 1871
Bathynectes piperitus Manning & Holthuis, 1981
Género *Macropipus* Prestandrea, 1833
Macropipus rugosus (Doflein, 1904)
Superfamilia XANTHOIDEA MacLeay, 1838
Familia XANTHIDAE MacLeay, 1838
Género *Monodaeus* Guinot, 1967
Monodaeus cristulatus Guinot & Macpherson, 1988
Subsección THORACOTREMATA Guinot, 1977
Superfamilia GRAPSOIDEA MacLeay, 1838
Familia PLAGUSIIDAE Dana, 1851
Género *Euchirograpsus* H. Milne-Edwards, 1853
Euchirograpsus liguricus H. Milne-Edwards, 1853

ESTUDIO TAXONÓMICO

El estudio taxonómico que aquí se presenta incluye la identificación de todas las especies de decápodos recogidas en las campañas *Maurit*. El inventario completo se recoge en el catálogo de especies y en el ANEXO I se relacionan todas las especies recogidas en cada una de las estaciones muestreadas.

Además, durante la realización de esta memoria hemos dado prioridad y dedicado mayores esfuerzos a la revisión y estudio detallado de aquellos grupos de decápodos cuyo conocimiento previo en el área de estudio era aún escaso y fragmentario: quirostiloideos, galateoidos, pagurouideos, talasinídeos y braquiuros. Los resultados obtenidos para dichos grupos dieron lugar a la preparación de cinco artículos científicos, tres de ellos ya publicados, uno que se publicará próximamente y otro en fase de evaluación, que en conjunto constituyen el núcleo fundamental de la tesis:

Matos-Pita, S. S. de y Ramil, F. (2014) Squat lobsters (Crustacea: Anomura) from Mauritanian waters (West Africa), with the description of a new species of Munidopsis. *Zootaxa*, 3765 (5): 418–434.

Matos-Pita, S. S. de y Ramil, F. (2015a) Hermit crabs (Decapoda: Crustacea) from deep Mauritanian waters (NW Africa) with the description of a new species. *Zootaxa*, 3926(2): 151–190.

Matos-Pita, S. S. de y Ramil, F. (2015b) New species of *Neopilumnoplax* Serène in Guinot, 1969 (Decapoda, Brachyura, Mathildellidae) from Northwest Africa with a key to the genus. *Marine Biodiversity*. DOI: 10.1007/s12526-015-0361-5

Matos-Pita, S. S. de y Ramil, F. (2015c) Additions to thalassinidean fauna (Crustacea: Decapoda) off Mauritania (NW Africa) with the description of a new genus and a new species. *Zootaxa*, 4020(3): 571–587.

Matos-Pita, S. S. de, Castillo, S. y Ramil, F. (enviado) Contribution to the knowledge of the deep brachyuran fauna (Crustacea: Decapoda) in waters off Mauritania (NW Africa). *Journal of Marine Biological Association of the United Kingdom*.

Por último, y con el objetivo de proporcionar una visión integrada de la fauna de decápodos, hemos incluido un sexto manuscrito en el que se describen las comunidades de decápodos de los fondos blandos de la plataforma profunda y talud de Mauritania, basándonos en el trabajo taxonómico completo y en los datos de abundancia y biomasa (peso fresco) obtenidos durante las campañas oceanográficas. Este manuscrito constituye uno de los capítulos de la monografía que publicará la Editorial Springer próximamente:

García-Isarch, E., S. de Matos-Pita, S., Muñoz, I., Mohamed, S. y Ramil, F. (en edición) Decapod assemblages in Mauritanian waters. En: Ramos, A., Sanz, J. L. and Ramil, F. (eds) *Deep-sea ecosystems off Mauritania: Researching marine biodiversity and habitats in West African deep-waters*. Springer, Heidelberg (aceptado)

QUIROSTILOIDEOS Y GALATEOIDEOS

Matos-Pita, S. S. de y Ramil, F. (2014) Squat lobsters (Crustacea: Anomura) from Mauritanian waters (West Africa), with the description of a new species of *Munidopsis*. *Zootaxa*, 3765 (5): 418–434.

En este trabajo se documenta la presencia de seis especies de quirostiloideos (1) y galateoideos (5) en la plataforma profunda y talud continental de Mauritania, recogidas con el arrastre comercial durante las campañas *Maurit*.

Como resultados más destacados cabe mencionar la descripción de una nueva especie para la ciencia, *Munidopsis anaramosae* S. de Matos-Pita & Ramil, 2014 y la redescripción de *Munidopsis chunii* Balss, 1913, incluyendo en este último caso un detallado estudio de las variaciones intraespecíficas observadas. Además se aportan datos biométricos y sobre los periodos de reproducción para todas las especies y se establece también su distribución geográfica y batimétrica. Para tres especies, *Munida speciosa* von Martens, 1878, *Munida guineae* Miyake & Baba, 1970 y *M. chunii* se amplía su límite de distribución septentrional; las dos últimas, *M. guineae*, *M. chunii* sólo habían sido citadas previamente del Golfo de Guinea. Asimismo se amplía el rango batimétrico de la especie *M. chunii*.

Resultados adicionales

Posteriormente al envío del trabajo arriba mencionado para su publicación se abordó la separación de las muestras recogidas con bou de vara y draga de roca, lo que nos proporcionó material de estudio adicional de estos grupos.

A partir del material recogido con el bou de vara se identificaron dos especies de galateoideos de las cuales una, *Munida speciosa*, se había capturado también con el arrastre comercial. La segunda especie, *Galathea wolffi* Miyake & Baba, 1970 sólo se había recogido previamente en el golfo de Guinea (localidad tipo), entre 260 y 650 m. Nuestra cita en el talud superior de Mauritania (306 m de profundidad) amplía su límite de distribución septentrional.

En las colecciones recogidas sobre fondos duros con draga de roca se identificaron cinco especies de las cuales dos, el quirostiloidéo *Eumunida bella* de Saint Laurent & Macpherson, 1990, capturada sobre la barrera de coral y los cañones submarinos, y el galatoideo *Munidopsis serricornis* (Lovén, 1852) recogido en la barrera de coral, ya habían sido capturados en los fondos blandos del talud. Las otras tres especies, los galateoideos *Munida intermedia* A. Milne Edwards & Bouvier, 1899, *Munida sanctipauli* Henderson, 1885 y *Munidopsis vaillantii* (A. Milne

Edwards, 1881) se recogieron exclusivamente en la barrera de coral y en los cañones la primera, sobre la barrera la segunda y en la zona de cañones la tercera.

Respecto a su distribución geográfica, *M. intermedia* ha sido citada en el Atlántico oriental con una distribución uniforme desde el norte del Golfo de Vizcaya hasta Dakar (Senegal), incluyendo Azores, Madeira y Mar Mediterráneo, a profundidades comprendidas entre 120 y 1360 m (Ingle y Christiansen, 2004). *Munida sanctipauli* muestra una distribución anfiatlántica con citas en Canadá, Florida, Azores, Canarias y Sahara occidental, a una profundidad media de 400-900 m (Saint Laurent y Macpherson, 1988). Nuestra cita incrementa ligeramente el área de distribución de esta especie hacia el sur. Con relación a *M. vaillantii*, las únicas citas que hemos podido encontrar en la bibliografía se refieren a la localidad tipo, en Oporto (Portugal, 41°13'N, 11°39'40"O, 1068 m) (Milne-Edwards, 1881, Milne-Edwards y Bouvier, 1900; ambas como *Elasmonotus vaillanti*). Nuestros registros amplían tanto su área de distribución geográfica hacia el sur, como su rango batimétrico a profundidades inferiores (405 m).

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Squat lobsters (Crustacea: Anomura) from Mauritanian waters (West Africa), with the description of a new species of *Munidopsis*

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Abstract

This paper is the result of the study of a squat lobsters collection obtained along the Mauritanian coast, between 91 and 1867 m depth, during the 'MAURIT' surveys carried out in the period from 2007 to 2010. *Eumunida bella* de Saint Laurent & Macpherson, 1990 (Chirostyloidea) and six species of *Munida* and *Munidopsis* (Galatheoidea) are reported in the present work.

A new species, *Munidopsis anaramosae* **n. sp.** collected off northwestern Banc d'Arguin at 1000–1012 m depth, is described and illustrated. The presence of an eyespine that arises distally from the middle end of the cornea, walking legs merus spinose on dorsal and ventral margins and cheliped merus ventrally unarmed distinguish it from related species. *Munida chunii* Balss, 1913 is redescribed here and the new records of *Munida guineae* Miyake & Baba, 1970, *M. speciosa* von Martens, 1878 and *Munidopsis chunii* Balss, 1913 extend their geographical distribution northwards, and in the case of the last species, increase its bathymetric range.

Key words: Chirostyloidea, Galatheoidea, *Eumunida*, *Munida*, *Munidopsis*, new species, Mauritanian waters, distribution

Introduction

Squat lobsters are an abundant, speciose and worldwide distributed group of colourful anomuran decapod crustaceans. They comprise two superfamilies, Chirostyloidea and Galatheoidea (Ahyong *et al.* 2010; Schnabel & Ahyong 2010) and both are represented in the present work.

The genus *Eumunida* (family Chirostylidae) comprises 28 species (Puillandre *et al.* 2011) mainly distributed in the Indo-Pacific region with only three occurring in the Atlantic: *Eumunida bella* de Saint Laurent & Macpherson, 1990, *Eumunida picta* Smith, 1883 and *Eumunida squamifera* de Saint Laurent & Macpherson, 1990. Of these, only *Eumunida bella* has been recorded in the Central East Atlantic but not in Mauritanian waters (Saint Laurent & Macpherson 1990; Baba *et al.* 2008).

Within the superfamily Galatheoidea, the taxonomic effort deployed during the last years has increased the 242 species of *Munida* (family Munididae) recognized by Baba *et al.* (2008), with the description of an additional 28 new species (Macpherson 2009; Cabezas *et al.* 2009; Hendrickx & Parente 2010; Cabezas *et al.* 2011; Komai 2011a, b; Komai 2012). Similarly with *Munidopsis* (family Munidopsidae), eight new species were recently described, raising to 232 the total number of valid species (Baba *et al.* 2008; Osawa *et al.* 2008; Taylor *et al.* 2010; Macpherson 2011; Komai 2011c; Lin & Chan 2011; Ahyong 2013). Nevertheless only 12 species of *Munida* and 17 of *Munidopsis* have been reported in the central Eastern Atlantic.

The knowledge of the families Munididae and Munidopsidae in Mauritanian waters is scarce, and only one species of *Munida*: *Munida rutllanti* Zariquiey Álvarez, 1952 (Anadón 1981) and four species of *Munidopsis*: *Munidopsis aries* (A. Milne Edwards, 1880), *M. curvirostra* Whiteaves, 1874, *M. hirtella* Macpherson & Segonzac, 2005 and *M. thieli* Türkay, 1975 (Anadón 1981; Macpherson & Segonzac 2005) were previously reported in this area.

This paper is based on the study of a collection of squat lobsters gathered during the four Ecosystem Surveys

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carried out by the Instituto Español de Oceanografía along the Mauritanian coast, and include the identification of seven squat lobster species, some of them not previously recorded from this area.

Material and methods

The four 'MAURIT' Ecosystem Surveys were carried out in the years 2007–2010 onboard R/V 'Vizconde de Eza', in the continental margins of Mauritania.

The samples were collected with a Lofoten otter trawl between 91 and 1867 m depth. The effective trawling time on the bottom for each trawl was 60 minutes. The invertebrates caught in each station were minutely sorted to species level whenever it was possible and the crustaceans were preserved in 70% alcohol for further studies. The station list and species collected by station are summarized in Table 1.

The terminology adopted herein follows mainly Baba (2005) and Macpherson (2011).

The size of the carapace is indicated as the postorbital carapace length (CL), measured along the dorsal midline from the posterior orbital margin to the posterior margin of the carapace. The terms flexor and extensor margins are only used for the maxillipeds merus and walking legs dactylus. The abbreviations used in the descriptions are as follows: Mxp, maxilliped; P1, pereiopod 1 (cheliped); P2–P4, pereiopods 2–4, second to fourth pereiopods (walking legs).

The holotype of *Munidopsis anaramosae* **n. sp.** is deposited in the 'Museo Nacional de Ciencias Naturales (CSIC)', Madrid (MNCN). The remaining material is largely deposited in the collections of the Instituto Español de Oceanografía (Oceanographic Centers of Cádiz and Málaga) and University of Vigo (Faculty of Marine Sciences, Marine Zoology Laboratory).

Systematics

Order Decapoda Latreille, 1803

Infraorder Anomura MacLeay, 1838

Superfamily Chirostyloidea Ortmann, 1892

Family Eumunididae A. Milne Edwards & Bouvier, 1900

Genus *Eumunida* Smith, 1883

***Eumunida bella* de Saint Laurent & Macpherson, 1990**

Eumunida bella de Saint Laurent & Macpherson, 1990: 660, figs 2b, 3, 4b, 5b, 6b, 8b and f, 9b, 10b.—Baba *et al.* 2008: 16 (list of references and synonymies).—Gonzalez *et al.* 2009: 2, fig. 1 (Cape Verde Islands, Canary Islands, 489–630 m).

Material examined. MAURIT 0811, Stn L96, 618–850 m, 1 male 40.1 mm.

Remarks. Our specimen agrees well with the description provided in Saint Laurent & Macpherson (1990).

Distribution. Morocco to Congo, including Canary and Cape Verde Islands; bathymetrical range from 150 to 640 m deep (Saint Laurent & Macpherson 1990); our specimen was collected between 618 and 850 m deep.

Superfamily Galatheoidea Samouelle, 1819

Family Munididae Ahyong, Baba, Macpherson, Poore, 2010

Genus *Munida Leach,* 1820

TABLE 1. Survey, station data and squat lobsters collected by station.

Survey	Station	Date	Latitude (N) start	Longitude (W) start	Depth start (m)	Latitude (N) end	Longitude (W) end	Depth end (m)	Species
MAURIT 1107	L04	18 November 2007	20°34′43"	18°32′26"	1812	20°31′49"	18°33′25"	1824	*Munidopsis curvirostra*
MAURIT 1107	L14	21 November 2007	20°39′01"	17°50′15"	502	20°36′18"	17°51′50"	511	*Munida speciosa*
MAURIT 1107	L51	3 December 2007	17°47′32"	16°39′47"	464	17°49′51"	16°39′13"	468	*Munida speciosa*
MAURIT 1107	L59	5 December 2007	16°47′37"	16°59′49"	1215	16°50′38"	16°58′34"	1282	*Munidopsis chunii*
MAURIT 1107	L60	5 December 2007	16°32′34"	17°06′28"	1512	16°29′45"	17°07′31"	1530	*Munidopsis chunii*
MAURIT 1107	L64	6 December 2007	16°23′28"	16°51′44"	452	16°26′24"	16°51′01"	468	*Munida guineae*
MAURIT 1107	L66	7 December 2007	16°23′09"	17°00′18"	1243	16°26′16"	17°00′20"	1317	*Munidopsis chunii*
MAURIT 1107	L68	7 December 2007	16°38′19"	16°59′29"	1136	16°41′10"	17°00′05"	1146	*Munidopsis chunii*
MAURIT 1107	L79	11 December 2007	18°04′20"	16°36′39"	554	18°07′20"	16°36′07"	576	*Munida speciosa*
MAURIT 0811	L07	19 November 2008	20°44′40"	17°37′37"	91	20°41′40"	17°38′19"	103	*Munida speciosa*
MAURIT 0811	L09	19 November 2008	20°29′25"	17°39′03"	94	20°26′46"	17°40′35"	120	*Munida speciosa*
MAURIT 0811	L10	20 November 2008	20°20′50"	17°53′30"	1012	20°18′23"	17°52′03"	1000	*Munidopsis anaramosae*
MAURIT 0811	L11	20 November 2008	20°09′23"	17°36′47"	110	20°06′30"	17°36′48"	110	*Munida speciosa*
MAURIT 0811	L13	21 November 2008	19°55′41"	18°01′07"	1808	19°530′5"	18°02′01"	1862	*Munidopsis curvirostra*
MAURIT 0811	L26	24 November 2008	17°58′21"	16°34′32"	343	17°55′27"	16°35′19"	346	*Munida speciosa*
MAURIT 0811	L33	26 November 2008	16°58′15"	16°53′52"	1331	16°53′20"	16°54′58"	1347	*Munidopsis chunii*
MAURIT 0811	L38	28 November 2008	16°31′47"	17°00′14"	1124	16°29′09"	16°58′47"	1010	*Munidopsis chunii*
MAURIT 0811	L39	29 November 2008	17°29′17"	16°37′14"	231	17°32′06"	16°36′04"	224	*Munida speciosa*
MAURIT 0811	L41	30 November 2008	16°05′49"	16°51′20"	109	16°08′23"	16°49′32"	105	*Munida speciosa*
MAURIT 0811	L49	1 December 2008	16°33′15"	16°48′07"	218	16°31′09"	16°48′27"	404	*Munida speciosa*
MAURIT 0811	L52	2 December 2008	17°00′55"	16°43′21"	102	17°03′33"	16°41′50"	104	*Munida speciosa*
MAURIT 0811	L96	13 December 2008	19°47′30"	17°18′26"	618	19°48′07"	17°20′32"	850	*Eumunida bella*
MAURIT 0911	L01	16 November 2009	18°48′25"	16°45′59"	303	18°46′46"	16°45′23"	304	*Munida speciosa*
MAURIT 0911	L15	22 November 2009	19°59′28"	17°57′28"	1746	19°59′01"	17°59′07"	1749	*Munidopsis curvirostra*
MAURIT 0911	L20	24 November 2009	20°42′48"	17°56′47"	975	20°39′26"	17°58′19"	984	*Munidopsis serricornis*
MAURIT 1011	L04	17 November 2010	20°18′09"	18°12′47"	1765	20°17′35"	18°09′47"	1773	*Munidopsis curvirostra*
MAURIT 1011	L05	18 November 2010	20°26′46"	17°40′13"	106	20°28′30"	17°40′19"	108	*Munida speciosa*
MAURIT 1011	L08	20 November 2010	20°10′10"	17°42′28"	827	20°11′26"	17°45′21"	850	*Munida speciosa*
MAURIT 1011	L09	20 November 2010	20°06′53"	17°39′08"	271	20°05′10"	17°38′37"	257	*Munida speciosa*
MAURIT 1011	L15	21 November 2010	19°43′50"	17°42′29"	1747	19°41′56"	17°40′08"	1867	*Munidopsis curvirostra*
MAURIT 1011	L40	6 December 2012	16°24′07"	17°00′32"	1275	16°27′04"	17°00′37"	1214	*Munidopsis chunii*
MAURIT 1011	L56	14 December 2010	18°26′32"	16°29′17"	106	18°26′22"	16°31′18"	137	*Munida speciosa*

Munida guineae Miyake & Baba, 1970

Munida guineae Miyake & Baba, 1970: 81, fig 7.—Baba *et al.* 2008: 98 (compilation).—Muñoz *et al.* 2012: 482 (Guinea-Bissau, 603–869 m).

Material examined. MAURIT 1107, Stn L64, 452–468 m, 1 male 19.1 mm.

Remarks. Our specimen agrees well with the holotype description. The spinulation and the morphology of the abdominal tergite 4 and maxilliped 3 point out that this material belongs undoubtedly to *M. guineae*.

Distribution. Only known from off Rio Muni (Equatorial Guinea) (Type locality) and Guinea-Bissau, between 260 and 869 m deep (Miyake & Baba 1970; Muñoz *et al.* 2012). This record extends the northern distribution to Mauritania.

Munida speciosa von Martens, 1878

Munida speciosa von Martens, 1878: 133.—Baba *et al.* 2008: 122 (compilation).—Muñoz *et al.* 2012: 482 (Guinea-Bissau, 75–809 m).

Material examined. MAURIT 1107, Stn L14, 502–511 m, 1 male 16.6 mm, 3 females 13.3–19.2 mm; Stn L51, 464–468 m, 1 male 13.4 mm, 1 female 16.2 mm; Stn L79, 554–576 m, 5 males 14.8–22.4 mm, 1 female 15.2 mm. MAURIT 0811, Stn L07, 91–103 m, 6 males 12.4–19.6 mm, 3 females 14.8–16.7 mm, 2 ovigerous females 15.6–16.9 mm; Stn L09, 94–120 m, 1 male 17.8 mm, 1 ovigerous female 17.1 mm; Stn L41, 105–109 m, 3 males 12.5–16.2 mm, 1 female 11.2, 1 ovigerous female 11.9 mm ; Stn L49, 218-404 m, 2 males 17.6–18.1 mm, 1 female 16.2 mm; Stn L52, 102–104 m, 5 ovigerous females, 9.3–10.7 mm. MAURIT 0911, Stn L01, 303–304 m, 3 males 12.1–17.1 mm, 1 female 12.8 mm. MAURIT 1011, Stn L05, 106–108 m, 2 males 17.0–18.7 mm, 2 ovigerous females 13.3–14.6 mm; Stn L09, 257–271 m, 1 male 22.7 mm, 1 ovigerous female 20.9 mm; Stn L56, 106–137 m, 7 males 10.9–18.6 mm, 3 females 10.2–11.5 mm, 1 ovigerous female 15.4 mm.

Remarks. Our specimens agree well with the detailed description of this species given in Miyake & Baba (1970).

The dorsal series of tubercles on the abdominal tergite 3 and maxilliped 3 merus spinulation ensures the identification of this material as *M. speciosa* separating it, at the same time, from the allied *Munida rutllanti* Zariquiey Álvarez, 1952 not represented in our collection but reported in previous works from Mauritanian waters. In our opinion, the similarity of both species and potential misidentifications make it difficult to provide a clear picture of the distribution of each species in northwest Africa.

Distribution. Senegal to north of Namibia, in depths from 108 to 809 m (Baba *et al.* 2008; Muñoz *et al.* 2012). Our records increase the northern distribution to Mauritania.

Family Munidopsidae Ortmann, 1898

Genus *Munidopsis* Whiteaves, 1874

Munidopsis chunii Balss, 1913

(Figs. 1–5)

Munidopsis chuni Balss, 1913: 224.
Munidopsis chunii.—Baba *et al.* 2008: 137 (compilation)

Material examined. MAURIT 1107, Stn L59, 1215–1282 m, 6 males 8.8–12.7 mm, 2 females 7.8–10.1 mm, 5 ovigerous females 8.0–11.4 mm; Stn L60, 1512–1530 m, 6 males 6.4–11.4 mm, 1 female 9.4 mm, 1 ovigerous female 8.1–10.3 mm; Stn L66, 1243–1317 m, 2 males 5.4–6.4 mm, 3 females 6.4–6.7 mm; Stn L68, 1136–1146 m, 31 males 7.6–12.4 mm, 24 ovigerous females 8.6–15.3 mm. MAURIT 0811, Stn L33, 1331–1347 m, 1 male 8.5 mm, 1 female 6.4 mm; Stn L38, 1010–1124 m, 6 males 10.9–13.5 mm, 3 ovigerous females 11.3–13.3 mm.

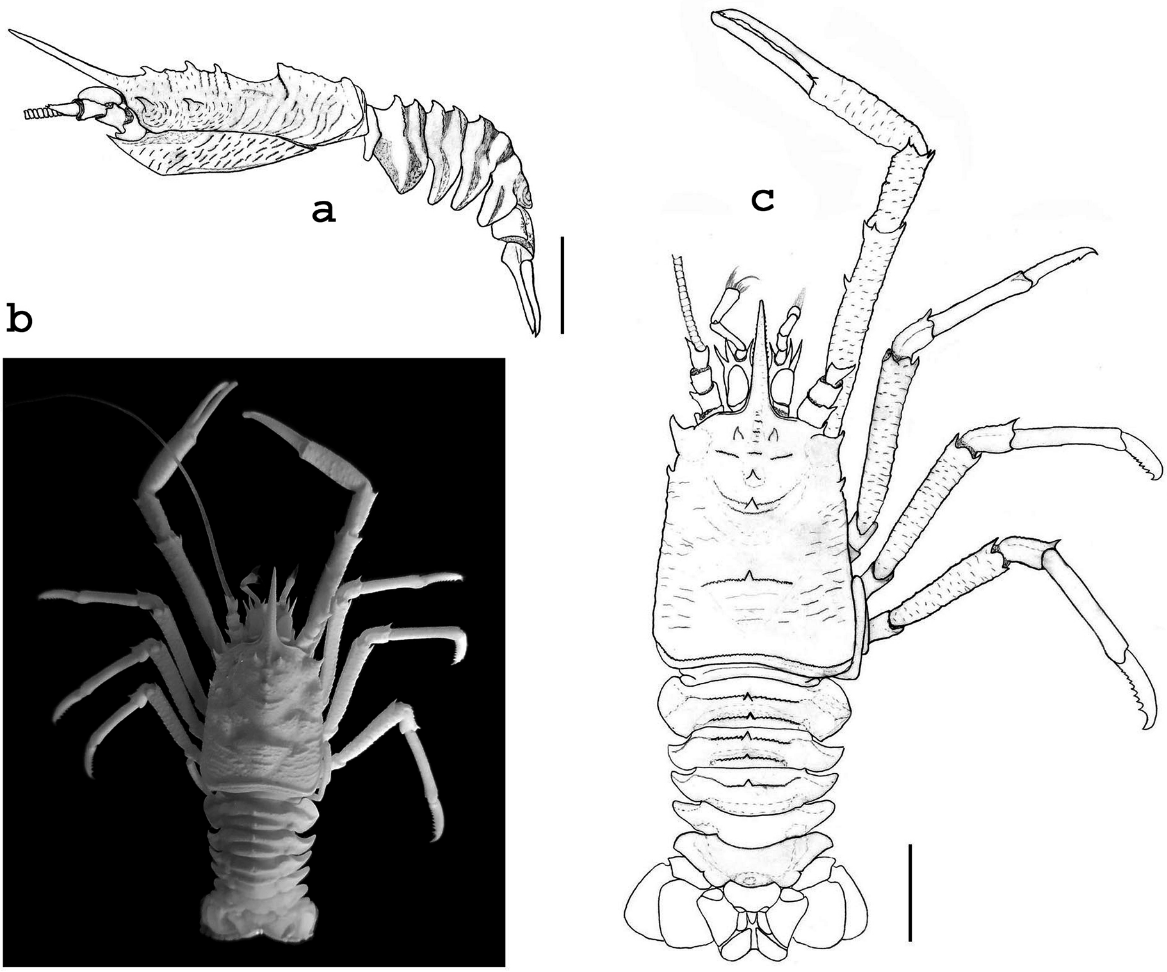

FIGURE 1. *Munidopsis chunii* Balss, 1913, MAURIT1107 Stn L68, male CL 11.8 mm. Entire animal a) lateral view, P1–4 removed b) dorsal view c) dorsal view. Scale bar a, c, 5 mm; a, c: all setae omitted.

MAURIT 1011, Stn L40, 1214–1275 m, 3 males 7.7–8.2 mm, 1 female 8.3 mm, 6 ovigerous females 8.6–11.0 mm.

Description. The following description is based on a male (11.8 mm) from MAURIT 1107 Stn L68, for variations of this species, unless otherwise specified, see below.

General: Carapace and legs covered with tuberculate transverse striae supporting bases of setae; setae scarce and short in the carapace, denser and somewhat long and plumose in the legs (Fig. 1b).

Carapace: Carapace longer than broad, with lateral margins somewhat diverging posteriorly. Dorsal surface with the different regions demarcated. Epigastric region with 2 transversal spines, each one followed apart by a minutely denticulate transverse striae at each side of the middle line; middle line from posterior to the base of the rostrum until protogastric region, with a weak longitudinal carina that is furnished with 3 or 4 separated and very short minutely tuberculate transverse striae (sometimes this carina can not be well appreciated). Mesogastric region with one median spine that arises from short minutely tuberculated transverse stria. Metagastric region with a median spine that arises from the anterior of 2 medium size minutely denticulated transverse striae that are curved anteriorly following the cervical sinus. Cardiac region with a median spine on a transversal ridge, the crest of this ridge is minutely denticulated. Frontal margin unarmed; weakly carinated at the base of the rostrum and minutely denticulated just behind antennal peduncle. Lateral margins with 2 prominent spines, the biggest one on the anterolateral margin over a conspicuous mamelon, the other one located on the anterobranchial region, over a smaller and rounded prominence too (Fig. 2e). Posterior margin with a minutely denticulated carina . All carapace spines are anteriorly directed (Fig. 1c). Pterygostomian flap surface with spaced minutely tuberculate transverse striae; ending anteriorly in 4–7 small and irregular teeth.

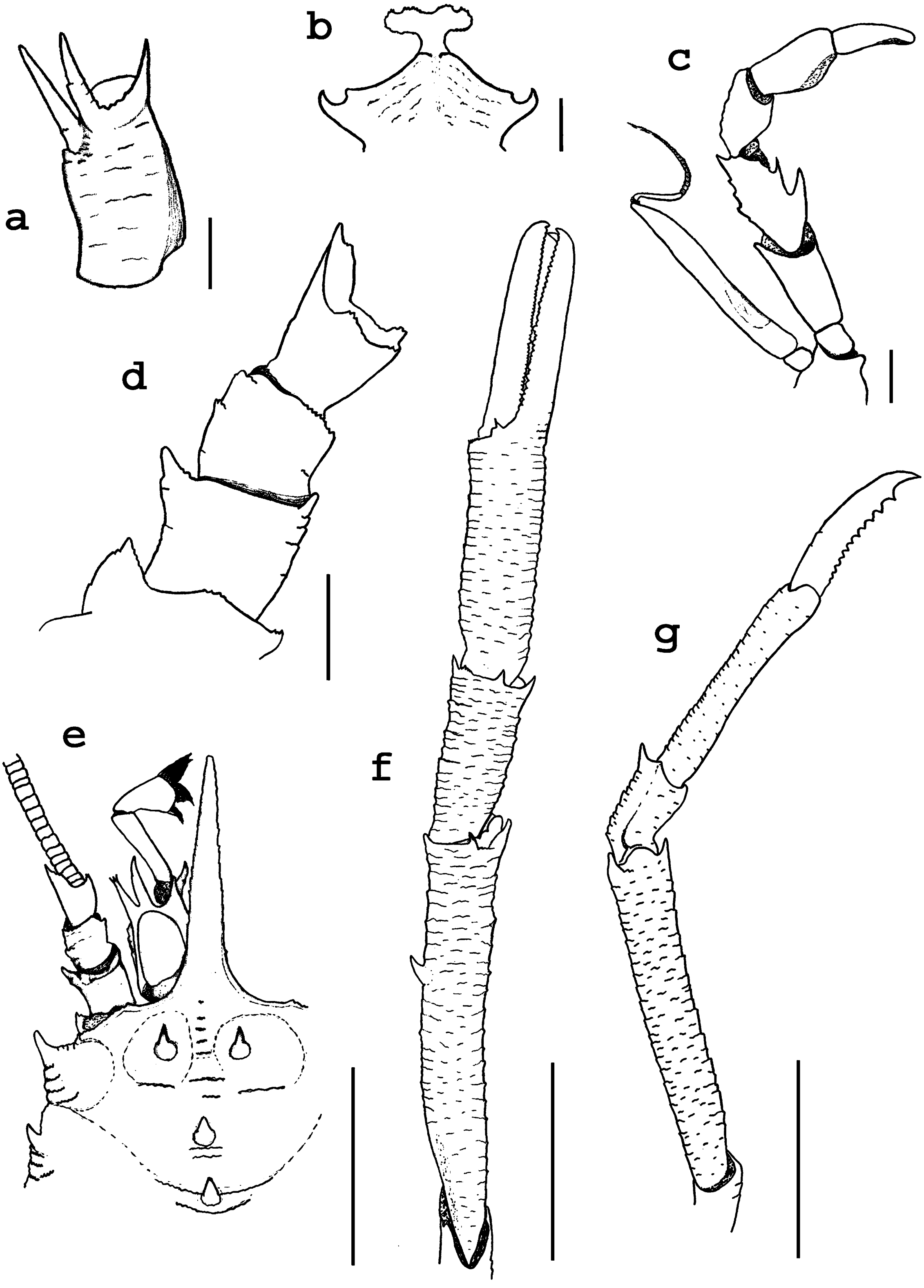

FIGURE 2. *Munidopsis chunii* Balss, 1913, MAURIT1107 Stn L68, male CL 11.8 mm a) right antennule peduncle, ventral view b) anterior sternum c) right mxp3, ventral view d) right antenna peduncle, ventral view e) anterior carapace, left detailed f) right cheliped, dorsal view g) right P2. Scale bar a–d 1 mm, e–g 5 mm; a–g: all setae omitted.

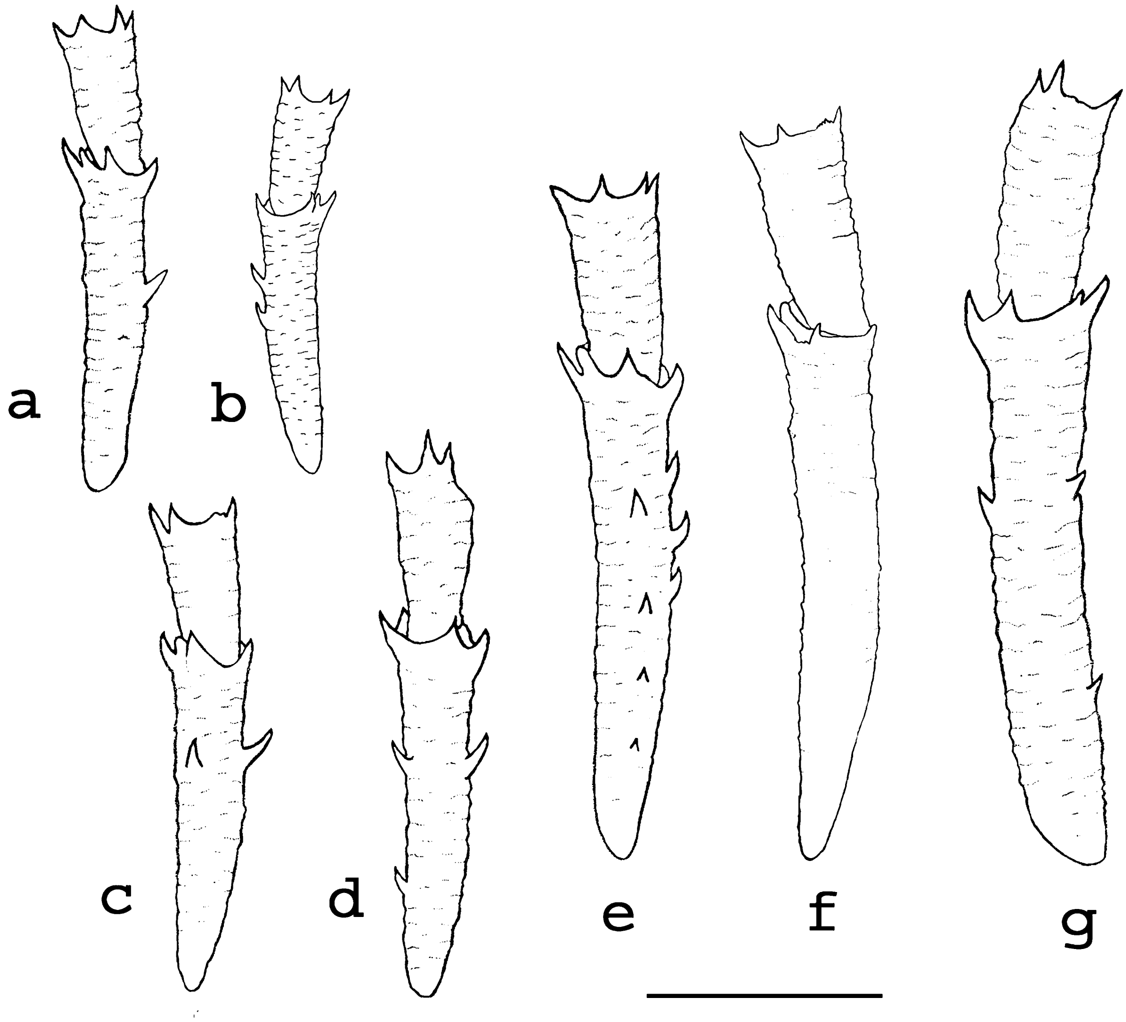

FIGURE 3. *Munidopsis chunii* Balss, 1913, variations on P1 carpus and merus spinulation. MAURIT 1011 Stn L40: a) left cheliped, dorsal view, male CL 8.3 mm b) right cheliped, dorsal view, ovigerous female CL: 8.64 mm. MAURIT 1107 Stn L59: c) left cheliped, dorsal view, male CL 8.8 mm d) left cheliped, dorsomesial view, ovigerous female CL 10.5 mm; Stn L60: e) left cheliped, dorsal view, male CL 11.4 mm; Stn L68: f) left cheliped, dorsal view, male CL: 11.8 mm. MAURIT 0811 Stn L38: g) right cheliped, dorsal view, male CL 13.3 mm. Scale bar 1 mm; a–g: all setae omitted.

Rostrum: Spiniform and running slightly upwards; about 1/2 (1/3 in females) length of the carapace; lateral margins furnished with denticles that are bigger and placed more apart each other in the base while they are smaller and closely placed distally; dorsally furnished with some short minutely tuberculate transverse striae, no carina neither dorsally nor lateral (Fig. 2e).

Sternum: Sternite 3 rectangular with rounded corners, about 4 times wider than high, anterior margin with a wide median concavity that is flanked laterally by 3–5 irregular denticles, this denticles are followed laterally by a small and rounded perforation in which the third maxilliped is articulated (Fig. 2b). Sternite 4 about 2.5 times as broad as the preceding one, narrowing anteriorly and with a rounded hollow on each side in which the P1 is articulated (Fig. 2b).

Abdomen: Tergites 2–4 each with 2 transverse ridges, anterior ones running laterally up to the tip of the pleuron; each ridge supports a row of small denticles in the crest on somites 2 and 3, while on somite 4 is unarmed and rounded. 2 median spines on tergites 2 and 3 arising respectively from anterior and posterior ridges; 1 spine over anterior ridge on tergite 4. Tergite 6 having posterior margin flanked by 2 conspicuous lobes with a rounded depression between the lobes (Figs. 1a, c). The uropod exopod margin, the lower and inner laterals of uropod endopod and free margins of the telson posterior plates, furnished with long plumose setae and with movable teeth;

exposed endopod dorsal surface when uropods retracted, with very short minutely tuberculate transverse striae suporting bases of simple setae. Telson composed of 12 plates (Fig. 1c); lateral plate free margin (outer lateral) with bristle setae in adult males and short plumose setae in adult females.

Eye: Ocular peduncles movable and very short. Cornea rather cylindrical, rounded distally and with smooth surface (Fig. 2e).

Antennule: Basal article armed with three large spines: one lateral, one distolateral and one distomesial; ventrodistal margin between these last 2 spines denticulate. The tip of the lateral spine on left antennule is trifid (this trifid tip was found only in this specimen, in the rest of the specimens examined was simple) (Figs. 2a, e).

Antenna: Basal article immovable, with triangular outer lateral margin and with the distal margin rounded and denticulate. Article 2 with a dorsodistolateral triangular prolongation with the rounded margin denticulate, one ventrodistolateral spine and one small subterminal ventrodistomesial spine. No distinct spines on article 3, but distomesial and distolateral margins denticulate. Article 4 with the lateral expansion spinose (Figs. 2d, e).

Maxilliped 3: Ischium about the same lenght of merus and with 18–21 denticles on the inner mesial ridge. Merus extensor margin with one distal spine, followed by 3 or 4 weak denticles (1 more notorious, 2 weak and 1 minute) each one furnished with 1 single setae, merus flexor margin with 2 strong spines and distal margin denticulate. Carpus, propodus and dactylus unarmed (Fig. 2c).

Pereopod 1 (cheliped): Chelipeds subequal, about 2.5 times the carapace length (without rostrum) in males, and 2 times in females. Ischium with one dorsodistal spine and a small distomesial submarginal spine. Merus with 4 distal spines: dorsomesial, dorsolateral, ventrolateral (subterminal) and ventromesial; one dorsomesial spine on distal half (in this specimen absent on left cheliped, see variations). Carpus about twice long as broad, with 4 distal spines: dorsomesial (sometimes double, see variations), dorsolateral, ventrolateral and a subterminal ventromesial one; the ventral and ventromesial distal margins minutely denticulated. Palm about 1.5 times carpus length, cylindrical and with a notorious spine at the distal dorsal margin, where the movable finger articulates. Fingers as long as palm, somewhat depressed and with cutting edges furnished with a row of irregular sized denticles (Fig. 2f). Epipod absent.

Pereopods 2–4: P2 overreaching P1 carpus when extended forward, P3 and P4 diminishing in length and overreaching carpus of the preceding leg (Fig. 1b). Merus with 2 distal spines (dorsal and ventrolateral). Carpus with 1 distodorsal spine and the ventral margin minutely denticulate and 2 weak carinae-like composed by very short transversal striae, one following the distodorsal spine, the other one parallel laterally and less notorious on P4. Propodus elongate, smooth and unarmed. Dactylus particularly setose on the extensor margin; flexor margin armed with 10-12 teeth decreasing in size proximally; each teeth is furnished subapically with a single seta (Fig. 2g). Epipods absent.

Color. Yellow cornea and orange-red exoskeleton with a white spot covering the central distal carapace and proximal rostrum in living specimens; whitish in alcohol.

Variations. In the foregoing description the basic spinulation of carapace, abdomen and chelipeds is detailed. Nevertheless, in the 102 specimens studied, we found many variations from this basic pattern. One or more of these variations, not related to sex, age or size of the animal, can appear together in the same specimen. These variations are summarized as follows: 69 specimens show a double distal dorsomesial spine on P1 carpus (Figs. 3a, b, d, e, g) instead of a single spine (Figs. 3c, f); 53 specimens display variations in the carapace dorsal gastric, cardiac and branchial spinulation pattern. The most common variations involve the presence of one additional spine over the protogastric region and/or over the posterior ridge on the metagastric region (Figs. 4b, d, f, g). Additional spines can be developed from the minutely dentate transverse striae on the anterior protogastric, lateral epigastric, mesogastric, metagastric, cardiac and dorsobranchial regions (Figs. 4a, c, e, h); these spines can be bifid (Fig 4f). The metagastric spine was absent in 3 specimens (Fig. 4i).

The spinulation along the P1 merus dorsal and ventromesial margins in 32 of the studied specimens varies, including either the absence of the typical spines from the basic pattern or the presence of additional ones (Figs. 3a–g).

The spinulation over abdominal tergites 2, 3 and 4 varies in 16 specimens, usually with additional spines formed by enlargement of some of the denticles over the transverse ridges, but in 5 of them, the spine on tergite 4 is absent. One specimen lacks spines on the posterior ridge of tergite 3 and on tergite 4. Another specimen shows the posterior ridge of the abdominal tergites 2 and 3 devoid of spines.

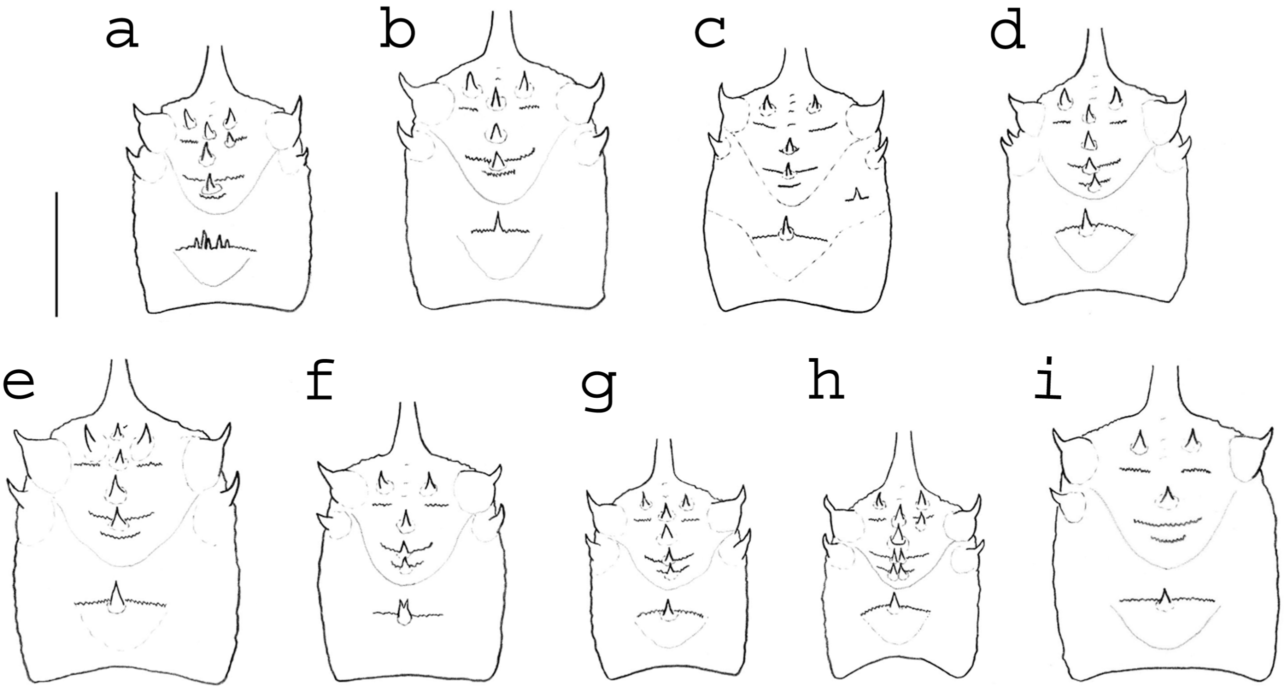

FIGURE 4. *Munidopsis chunii* Balss, 1913, variations on dorsal and lateral carapace spinulation. MAURIT 1107 Stn L68: a) male CL 8.8 mm b) ovigerous female CL 9.9 mm c) male CL 9.0 mm. MAURIT 1011 Stn L40: d) ovigerous female CL 9.0 mm. MAURIT 1107, Stn L59: e) ovigerous female CL 10.5 mm f) male CL 8.8 mm g) female CL 7.8 mm; Stn L60: h) male CL 7.6 mm i) ovigerous female CL 10.3 mm. Scale bar 5 mm; a–i: all setae omitted.

Variations in the anterolateral and laterobranchial spinulation of the carapace were observed in four individuals, including either the absence or the presence of additional spines (Figs. 4 d, i). One specimen shows a double distodorsal spine on right P4 merus and another exhibits an abnormal T-shaped fixed finger on right cheliped. Furthermore, we found too that the denticles on the mxp3 extensor margin are variable and related to the size of the animal. In this way, those with CL around 6 mm have two denticles (Fig. 5a); with CL: 8–10 mm they have two denticles (Fig. 5b), two denticles and one seta (Fig. 5c) or even three denticles (Fig. 5d); with CL over 10 mm they can have three denticles (Fig. 5f), three denticles and one seta (Fig. 5e) or four denticles (Fig. 5c); all denticles are furnished with one seta. Mxp3 flexor margin spinulation displays some variations too, involving several small spines developed from the denticulate distal margin, and also additional spines between the major ones, in this case always related with the biggest specimens (Fig. 5g).

Distribution. Only recorded from two areas: near Victoria, Cameroon (type locality) and along Namibia, in depths from 400 to 710 m (Doflein & Balss 1913; Macpherson 1983). Our records extend the geographical distribution northwards to Mauritania and also increase its bathymetrical range from 710 to 1530 m deep.

Remarks. The first description of this species is only a brief diagnosis (Balss 1913). Later, Doflein & Balss (1913) provide a little more extended description of the same specimens and they add a figure of this species too. These descriptions were based only in two specimens, one male and one small female and no further description are reported in the literature. Our specimens, both males and females, agree well with the male description given by Doflein & Balss (1913), and the differences appreciated, in both males and females, can be explained after the variations above mentioned.

This species has been confused with *Munidopsis bispinata* Miyake & Baba, 1970; but the two species can be separated by the following features:

The rostrum is about 1/3–1/2 length of the carapace in *M. chunii*, but about 1/4–1/3 in *M. bispinata*.

The abdominal tergites 2 and 3 carry two spines, one on the anterior and one on the posterior transverse ridge in *M. chunii* but only a single spine on the anterior transverse ridge in *M. bispinata*. Both species have a single spine on abdominal tergite 4 anterior ridge.

The antennal peduncle basal article has a small tubercular tooth and article 3 has a minute spine on the outer distal margin in *M. bispinata*; these are absent in *M. chunii*.

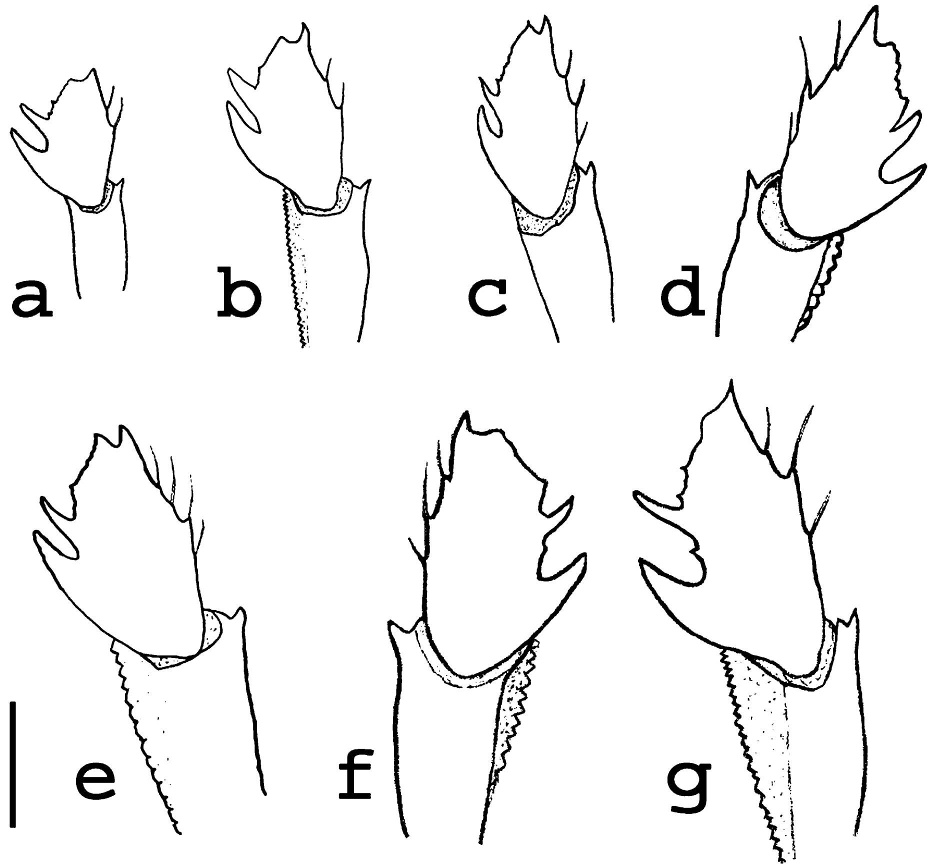

FIGURE 5. *Munidopsis chunii* Balss, 1913, variations on mxp3 merus flexor and extensor margins. MAURIT 0811 Stn L33: a) left mxp3 merus, ovigerous female CL 6.4 mm. MAURIT 1011 Stn L40: b) left mxp3 merus, female CL 8.3 mm c) left mxp3 merus, female CL 8.3 mm d) right mxp3 merus, male CL 8.9 mm. MAURIT 1107 Stn L68: e) left mxp3 merus, ovigerous female CL 10.5 mm f) right mxp3 merus, ovigerous female CL 11.8 mm g) left mxp3 merus, ovigerous female CL 12.2 mm. Scale bar 1 mm.

The mxp3 merus extensor margin has 2–4 small denticles or setae in *M. chunii* but only one seta and no denticles in *M. bispinata*. The meral flexor margin has 2 strong spines and the distal margin is most denticulate in *M. chunii,* whereas in *M. bispinata,* there are three spines, the distal one being very minute.

The P2 carpus has one dorsal spine (the distal one) in *M. chunii* while it has two dorsal spines in *M. bispinata*.

The P2–4 dactylus flexor margin is armed with 10–12 teeth in *M. chunii* but only seven in *M. bispinata*.

Some of these features, mainly those applicable to the spinulation of the abdominal somites and mxp3 merus, can be very variable as we have explained above. In consequence, to ensure the correct identification of the species, consideration of the combination of these features is required.

The records for this species in the literature cited depths of 400 to 710 m, whereas all our specimens were captured at depths greater than 1000 m.

Munidopsis curvirostra Whiteaves, 1874

Munidopsis curvirostra Whiteaves, 1874: 212.—Baba *et al.* 2008: 138 (list of references and synonymies).

Material examined. MAURIT 1107, Stn L04, 1812–1824 m, 1 ovigerous female 8.6 mm. MAURIT 0811, Stn L13, 1808–1862 m, 3 males 7.2–8.2 mm. MAURIT 0911, Stn L15, 1746–1749 m, 1 female 7.1 mm. MAURIT 1011, Stn L04, 1765–1773 m, 1 ovigerous female 11.7 mm, Stn L15, 1747–1867 m, 1 ovigerous female 7.6 mm.

Remarks. Our specimens agree well with those described for the East Atlantic Ocean by Selbie (1914) and Macpherson & Segonzac (2005).

Distribution. This species is known from Iceland to Mauritania in the eastern Atlantic and from Davis Straits to North Carolina in the western Atlantic; this species has been also cited at the Lord Howe Ridge, southwest Pacific (Khodkina 1981). Its bathymetrical range varies between 329 (Whiteaves 1874) and 2430 m.

Munidopsis serricornis (Lovén, 1852)

Galathea serricornis Lovén, 1852: 22
Munidopsis serricornis.—Baba *et al.* 2008: 159 (list of references and synonymies).

Material examined. MAURIT 0911, Stn L20, 975–984 m, 1 male 7.7 mm.

Remarks. Our specimen agrees well with those described for the Atlantic Ocean by Selbie (1914, as *Munidopsis* (*Galathodes*) *tridentata*), Mayo (1974), Baba (1988) and Baba & Poore (2002).

Distribution. In the Atlantic Ocean, *M. serricornis* has been recorded from the Scandinavian coast and Iceland to Cape Verde Islands including the Mediterranean Sea, Mid-Atlantic Ridge and from off Georgia to Dominica in the west side. In the Indo-Pacific, it is reported from Madagascar to Sri Lanka, Malay Archipelago and southwestern Australia. The bathymetrical range varies between 145 to 2165 m deep. This is the first record from the Mauritania coast.

Munidopsis anaramosae n. sp.
(Figs. 6–7)

Holotype. MNCN 20.04/9118, one male 15.4 mm (Total length, rostrum included, 39.2 mm; maximum wide, 13.1 mm); MAURIT 0811, Stn L10, off NW Banc d'Arguin (Mauritania) 20°20´50"N, 17°53´30"W to 20°18´23"N, 17°52´03"W, 1012–1000 m, 20 November 2008.

Etymology. This species is devoted to Dr. Ana Ramos in appreciation and recognition of her genuine enthusiasm, hard work and dedication in order to improve the knowledge of benthic fauna in African coasts.

Diagnosis. Carapace dorsally unarmed, abdomen smooth, unarmed; eye immovable, eyespine arising distally from the middle end of the cornea; no ventral spines on cheliped merus, P2–4 merus with strong spines on dorsal and ventral margins; sternite 4 anterolateral margin denticulate with a strong acute distal spine.

Description. *General*: Most carapace, legs, telson and endopod of uropods covered with numerous short ridges supporting bases of plumose setae (Fig. 6b); setation denser on legs; two spots hairless on dorsal carapace behind antennal spines and two other triangular ones lateral to cardiac ridge; ventral carapace and abdomen mostly hairless. Dorsal abdomen moderately setose not on ridges but over the exoskeleton, as occurs on dorsal anterior part of carapace.

Carapace: 1/3 longer than wide (rostrum included) with lateral margin somewhat diverging posteriorly, dorsally spineless, although with 1 low tubercle over each hepatic mesobranchial, post-cardiac and metabranchial regions can be recognized (Fig. 6c). Dorsal regions well delimitated by distinct grooves; anterior to cervical groove almost smooth with some scarce granulation on epigastric and hepatic regions. Cardiac region with moderately elevated transverse ridge about 1/3 as wide as carapace. Low, short and closely placed transverse ridges supporting bases of setae on upper posterolateral region. Frontal margin oblique with well-developed antennal spine. Lateral margin with the anterolateral spine small, acute and ventral to level of lateral margin; the lateral anterobranchial spine as large as antennal spine and followed backwards by 5 small conspicuous denticles (Figs. 6a, c, 7g). Posterior carapace ridge unarmed. Pterygostomian flap with an anterior small and acute spine; surface covered with low and short ridges.

Rostrum: Triangular, somewhat wider proximally; about 1/3 of carapace length and slightly overreaching cheliped merus in dorsal view. Distolateral margins minutely dentate. Horizontal in lateral view and with a weak dorsal longitudinal carina.

Sternum: Sternite 3 about 2 times wider than long and with rounded margins; anterior margin with shallow median notch flanked by a pair of spines followed laterally by an irregular dentition (Fig. 7f). Sternite 4 about 3 times as broad as preceding one, narrowing anteriorly, with anterolateral margins denticulate and preceded by a strong spine; some short setose midline ridges in the distal middle surface can be observed too (Fig. 7f).

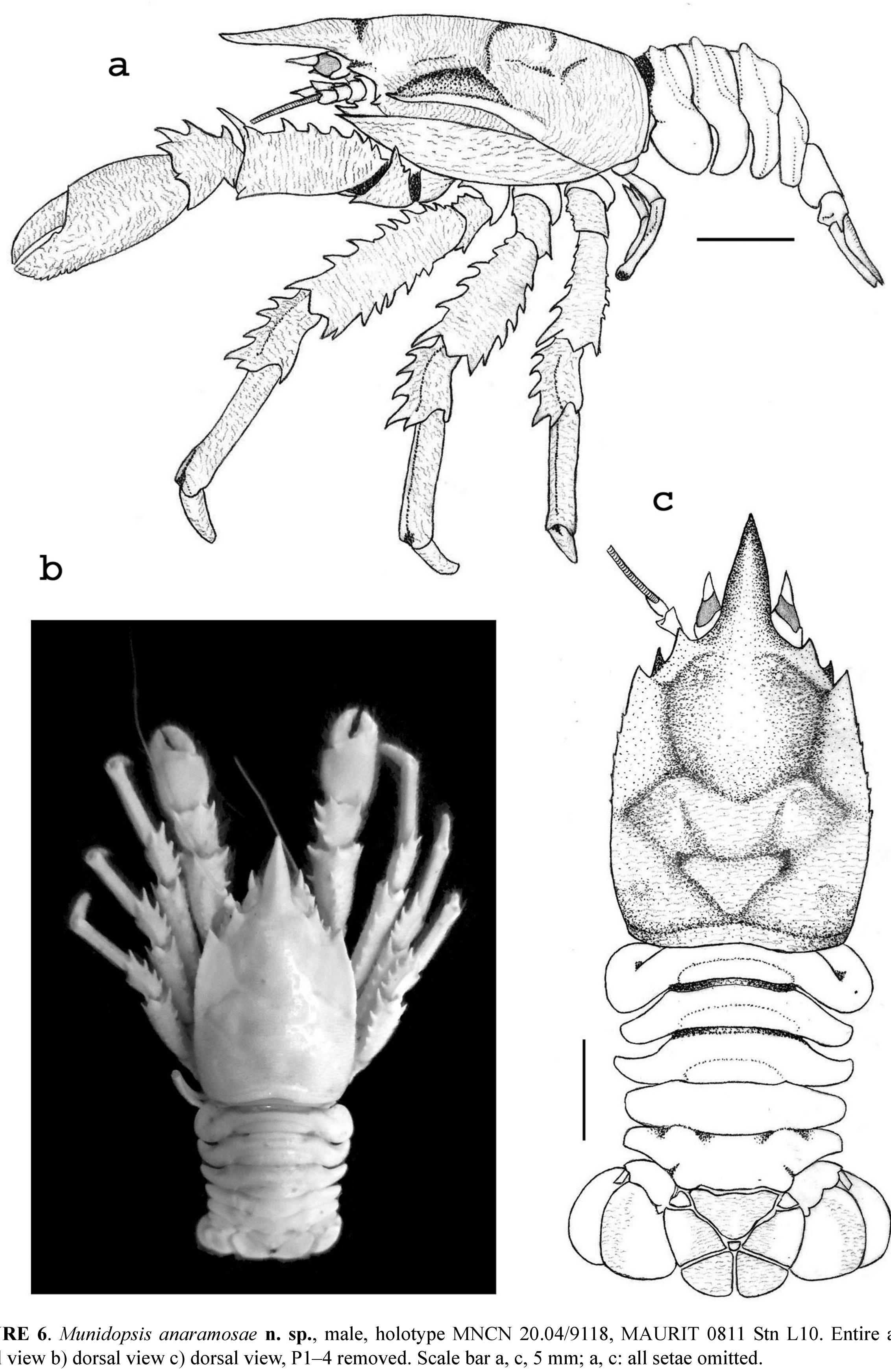

FIGURE 6. *Munidopsis anaramosae* **n. sp.**, male, holotype MNCN 20.04/9118, MAURIT 0811 Stn L10. Entire animal a) lateral view b) dorsal view c) dorsal view, P1–4 removed. Scale bar a, c, 5 mm; a, c: all setae omitted.

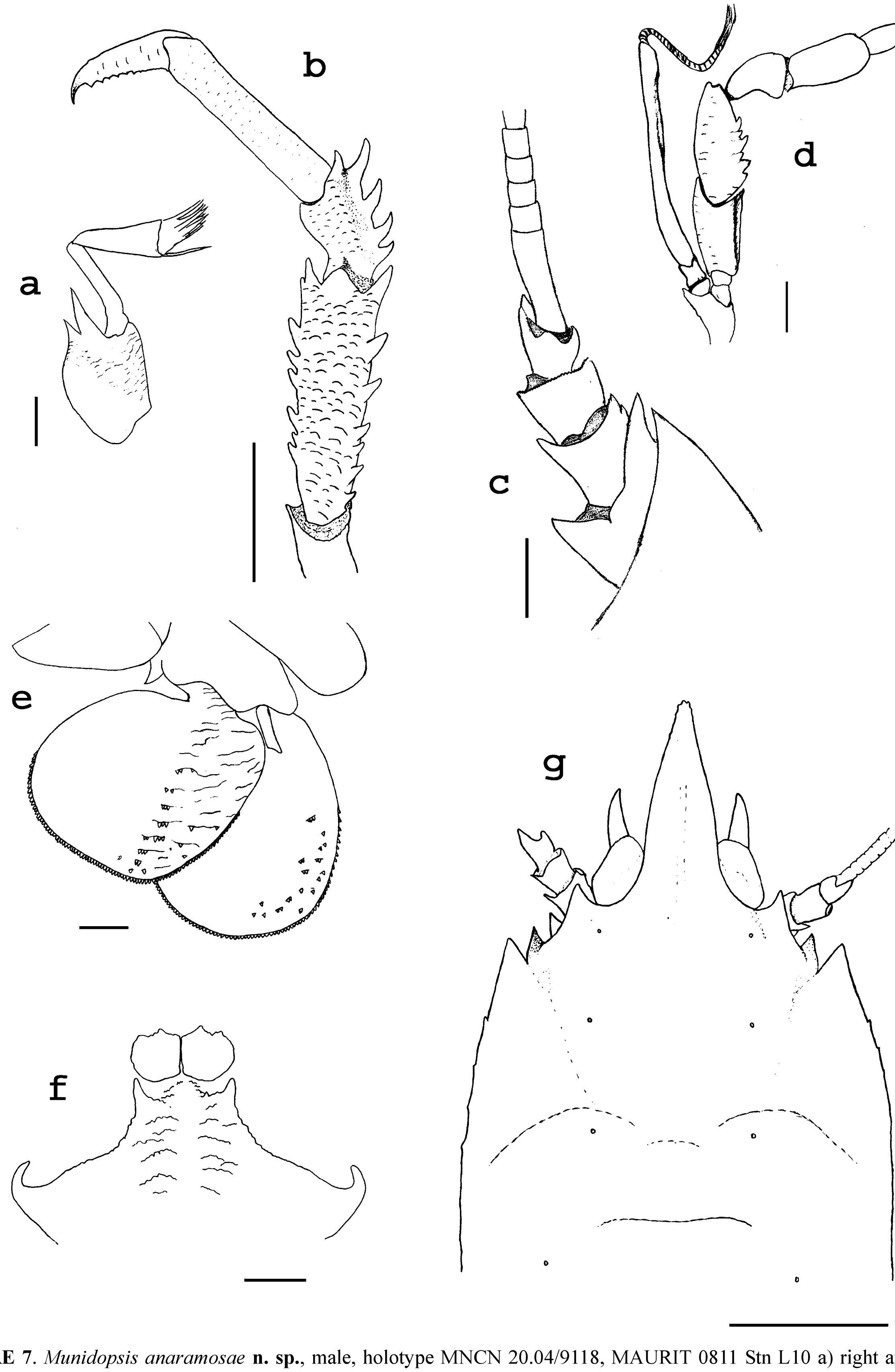

FIGURE 7. *Munidopsis anaramosae* **n. sp.**, male, holotype MNCN 20.04/9118, MAURIT 0811 Stn L10 a) right antennula, ventral view b) left P2 c) right antenna, ventral view d) right mxp 3, ventral view e) right uropod, dorsal view f) anterior sternum g) anterior carapace. Scale bar: a, c, d–f, 1 mm; b and g, 5 mm; all setae omitted.

Abomen: Dorsal surface unarmed. Tergites 2–4 bearing 2 transverse ridges each, the anterior narrower and raised than posterior one and reaching the pleuron (Fig. 6a). Tergite 6 with transverse posterior margin flanked by 2 conspicuous lobes. Distolateral and posterior margins of uropods exopod and endopod are provided with minute movable spines; uropods endopod dorsolateral surface with short ridges supporting bases of plumose setae and some scattered movable spines isolated or in groups of 2 or 3; uropods exopod with some few of these groups of movable spines on dorsolateral surface (Fig. 7e). Telson composed of 8 plates (Fig. 6c).

Eye: Ocular peduncles immovable. Cornea obliquely oval in dorsal view, non-pigmented (orange when alive). 2 eyespines, one well-developed arising from distal end of cornea, little short than eyestalk in dorsal view; the other one mesioventral and smaller, hardly visible in dorsal view.

Antennule: Basal article of antennula with 2 spines, one distodorsal and the other distolateral (Fig. 7a).

Antenna: Antennal peduncle short, reaching the middle of the main eye spine. Article 1 with one distolateral discrete spine and a strong distomesial spine. Article 2 with distolateral spine, mesial margin minutely serrated. Article 3 with 1 distomesial spine (Fig. 7c).

Maxilliped 3: Merus slighty broader than ischium, bearing 4 or 5 irregular spines on flexor margin and 2 low denticles on dorsodistal extensor margin. Ischium with one distoventral spine and 21 denticles on *crista dentata*. Carpus, propodus and dactylus unarmed (Fig. 7d).

Pereopod 1 (cheliped): Chelipeds subequal, about the same length as carapace (rostrum included), with short pilosum ridges all over dorsal surface. Ischium with distodorsal, distoventral and distomesial spines, distodorsal one followed by another blunt spine; distomesial margin serrated. Merus with 4 distal spines (dorsal, lateral, mesiodorsal and mesioventral); dorsal spine joined proximally with a longitudinal row of 5 other spines on dorsal crest; ventral surface unarmed. Carpus as long as broad, bearing 3 spines (dorsolateral, dorsal and mesiodorsal), the latter followed mesiodorsally by an oblique crest of 2 strong spines; ventral distomesial margin minutely denticulate. Palm as long as broad, spineless; fixed finger denticulate on anteroexternal margin; movable finger as long as palm; prehensile margin of the fingers spooned distally and followed proximally by a weakly crenulated carina, more notorious on fixed finger. Epipod absent.

Pereopods 2–4: P2–4 covered with short setose ridges more abundant on dorsal surface. P2 almost reaching the tip of chelipeds when extended forward. P3 and P4 diminishing in lenght and reaching middle propodus of the preceding leg. P2–4 meri relatively broad and compressed, with 7, 5 and 4 strong and acute spines respectively on dorsal margin and 4–5 spines on ventral margin (Fig. 6a). Each carpus with 2 dorsodistal spines: strong dorsal one followed by 3 other strong dorsal spines and the other one less strong and followed laterally by a conspicuous carina; ventral distomesial margin denticulate. Propodus less than twice length of dactylus, ventral margin ending in 3 movable spines. Dactylus ending in relatively short, strongly curved claw, flexor margin with 10 teeth decreasing in size proximally (Fig. 7b). Right P5 lost. Epipods absent.

Color. Whitish exoskeleton with orange cornea when alive; setae often covered with mud particles giving a dark appearance to the whole animal. Whitish in alcohol.

Distribution. Only known from the type locality: off northwestern Banc d'Arguin, Mauritania, 1006–1012 m deep.

Remarks. Chace (1942), aiming to compare and identify the species in the speciose genus *Munidopsis*, subdivided it into artificial groups, bringing together related species using some relevant morphological features. In this way *M. spinoculata* (A. Milne Edwards, 1880) and *M. hendersoniana* Faxon, 1893 were grouped by "the huge terminal spine of the eyestalk practically passes through the cornea". Baba (1988) described two new species, *M. bispinoculata* and *M. similior*, that he included in this group, and he added three more species: *M. pilosa* Henderson, 1885, *M. ramahtaylorae* Pequegnat and Pequegnat, 1971 and *M. subspinoculata* Pequegnat and Pequegnat, 1971. Other species that can be referred to this group too are: *M. victoriae* Baba & Poore, 2002, *M. rotundior*, Baba, 2005 and now *M. anaramosae* **n. sp.**, raising to ten the number of *Munidopsis* species provided with a well-developed eyespine arising from the distal end of the cornea.

Munidopsis victoriae (type locality off Portland, Victoria, southeastern Australia, 990 m), *M. hendersoniana* (see Baba 2005: 152; Gulf of Panama, Pacific Ocean, 915–1897 m) and *M. pilosa* (Indian and western Pacific Oceans, 732–1600 m) are provided with spines on the dorsal and ventral margins of the P2–4 merus; nevertheless in *M. hendersoniana* and *M. pilosa* the cornea become divided into mesial and lateral lobes by ocular peduncle but not in our species. *Munidopsis victoriae* shows the cornea undivided like in *M. anaramosae*, but cheliped merus bears 2–4 ventral spines while is unarmed in *M. anaramosae*. Moreover, these three species show a different morphology and sculpture on sternites 3 and 4.

Munidopsis ramahtaylorae Pequegnat & Pequegnat, 1971, *M. spinoculata* (A. Milne Edwards, 1880) and *M. subspinoculata* Pequegnat & Pequegnat, 1971 were recorded from the Atlantic Ocean but none of them have spines on the dorsal and ventral margins of the P2–4 carpus.

Munidopsis bispinoculata Baba, 1988, *M. rotundior* Baba, 2005 and *M. similior* Baba, 1988, known from the Indian and Pacific Oceans, have the P2–4 merus spinose but only on the dorsal margin. The absence of spines on the ventral margins of the P2–4 merus in these three species separates them from *M. anaramosae* **n. sp** in which the P2–4 meri are provided with spines on the dorsal and ventral margins. None of the last three species have been recorded from Atlantic Ocean. Therefore, *M. anaramosae* **n. sp.** is the first species of the genus, having the eyespine arising from distal end of the cornea and with the dorsal and ventral margins of the P2–4 merus spinose, recorded in the Atlantic Ocean.

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CANGREJOS ERMITAÑOS

Matos-Pita, S. S. de y Ramil, F. (2015) Hermit crabs (Decapoda: Crustacea) from deep Mauritanian waters (NW Africa) with the description of a new species. *Zootaxa*, 3926(2): 151–190.

En este trabajo se estudian 13 especies de cangrejos ermitaños recolectados con el arte de arrastre comercial y el bou de vara sobre los fondos blandos de la plataforma profunda y talud continental de Mauritania.

Cabe destacar, en primer lugar, la descripción de la nueva especie *Paguristes candelae* S. de Matos-Pita & Ramil, 2015 y la reasignación de *Paguristes mauritanicus* Bouvier 1906 y *Paguristes marocanus* A. Milne-Edwards & Bouvier, 1891 a los géneros *Areopaguristes* Rahayu & McLaughlin, 2010 y *Pseudopaguristes* McLaughlin, 2002 respectivamente, tras haber revisado el material tipo de ambas especies depositado en el Museo Nacional de Historia Natural de París. Además, se describen por primera vez las hembras de *P. marocanus* y se amplía la distribución septentrional de *P. marocanus* y *Paragiopagurus macroceros* (Forest, 1955), que junto con *Diogenes pugilator* (Roux, 1829) se citan por primera vez en aguas de Mauritania, también se amplía el rango batimétrico de *A. mauritanicus*, *P. marocanus* y *P. macroceros*. Para cada una de las especies estudiadas se incluyen datos sobre la presencia de machos, hembras y juveniles, biometrías e información sobre el tipo de fondo en el que fueron recogidas, preferencias en la ocupación de conchas y fauna epibionte sobre las mismas.

Resultados adicionales

Después de enviado el manuscrito a la revista para su evaluación y durante el proceso de revisión del mismo hemos tenido la oportunidad de estudiar material adicional, recolectado en los cañones y en la montaña submarina con la draga de roca.

Uno de los ejemplares examinados se identificó como *Paguristes candelae* y fue incluido como paratipo en la publicación (ver pág. 164). Los demás ejemplares correspondían a *Paragiopagurus macroceros* y *Dardanus arrosor* (Herbst, 1796), ambas incluidas ya en Matos-Pita y Ramil (2015a). Cabe mencionar que los nuevos registros de *P. macroceros* recolectados sobre fondos duros entre 407 y 488 m de profundidad amplían el rango batimétrico de la especie, cuyo límite inferior se había establecido en 362–364 m (Matos-Pita y Ramil, 2015a).

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Hermit crabs (Decapoda: Crustacea) from deep Mauritanian waters (NW Africa) with the description of a new species

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Table of contents

Abstract

Thirteen hermit crab species of the families Diogenidae, Paguridae and Parapaguridae were captured in deep waters off Mauritania during Maurit surveys. A new species of the genus *Paguristes*, *Paguristes candelae* n. sp., is described. *Areopaguristes mauritanicus* n. comb. is proposed for *Paguristes mauritanicus* Bouvier, 1906 and *Pseudopaguristes marocanus* n. comb. for *Paguristes marocanus* A. Milne-Edwards & Bouvier, 1892; the females of the latter species are reported for the first time. Our data extends the geographical distribution of *Pseudopaguristes marocanus* southwards and that of *Paragiopagurus macroceros* northwards. Both species, together with *Diogenes pugilator* (Roux, 1829), are recorded for the first time in Mauritanian waters. New data about bathymetric ranges are also reported for *Pseudopaguristes marocanus* n. comb., *Areopaguristes mauritanicus* n. comb. and *Paragiopagurus macroceros*.

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Key words: Diogenidae, Paguridae, Parapaguridae, *Areopaguristes*, *Pseudopaguristes*, *Paguristes* new species, Mauritania, deep-sea

Introduction

A. Milne-Edwards & Bouvier (1891, 1892, 1900) and Bouvier (1906) were the first authors to describe hermit crabs in West African waters, but current knowledge in this area is mainly based on the works of Forest (1952a–f, 1953, 1954a, 1955, 1956, 1961, 1966, 1978). Additional data can be found in general studies on crustaceans or decapods, such as those by Stebbing (1908) and Barnard (1950) in South African waters, Maurin (1968) in Northwest Africa and, more recently, in papers by Macpherson (1983) from Namibia, García-Raso (1996) from the Ibero-Moroccan Gulf and Muñoz *et al*. (2012) from Guinea-Bissau.

The review of the family Parapaguridae in the East Atlantic (Lemaitre 1990) and the monograph on hermit crabs in the Northeast Atlantic (Ingle 1993) provided detailed descriptions and clarified the taxonomic status and synonymies of the known species in this area. Consequently, this group is well known in the East Atlantic, although some areas remain poorly studied.

Hermit crabs from Mauritanian waters known to date are cited in the checklist of Monod (1933) and in some of the above-mentioned literature. However, no published works have exclusively dealt with hermit crabs in Mauritanian waters.

From 2007 to 2010, the Maurit surveys systematically sampled the entire Mauritanian coast, resulting in the most significant collection of hermit crabs ever captured in this area. This work presents the results of the study of this collection.

Material and methods

The Maurit surveys were carried out annually in November and December from 2007 to 2010 onboard the Spanish R/V Vizconde de Eza. A total of 291 stations were sampled at depths from 80 to 2000 m with a commercial trawl (Lofoten type) following a random stratified sampling methodology. Additionally, 25 stations distributed along five transects perpendicular to the coastline in five bathymetric strata (150, 300, 500, 1000 and 1500 m) were sampled with a 3.5 m-wide Agassiz trawl (see Map 1).

Hermit crabs were captured at 83 stations: 71 were sampled with the Lofoten trawl and 12 with the Agassiz trawl. At each station the hermit crabs were carefully sorted from the total catch, photographed and subsequently preserved in 70% ethanol for further studies in the laboratory. The list of species collected by station and data from each station is given in Table 1.

The classification adopted in this work follows Ahyong *et al*.'s (2011) scheme to the family level. Species assignments to family follow McLaughlin *et al*. (2010). Families, genera and species are listed in alphabetical order.

For each species, we provide relevant literature with descriptions and figures, and recent references to distribution in the region. Comprehensive former literature references can be checked in Alcock (1905) and Gordan (1956). For the uncommon species, *Pseudopaguristes marocanus* n. comb. and *Paragiopagurus macrocerus* (Forest, 1955), we include all the available literature to date. The material examined includes station code (station data can be checked in Table 1), number of specimens (in brackets) and maximum and minimum shield lengths for males, females and ovigerous females, measured from the tip of the rostrum or midpoint of the rostral lobe to the midpoint of the posterior margin of the shield. Type specimens and additional material examined were also included for some species. In addition we provide some comments about habitat, including sediment type, inhabited shells and symbionts, both from literature and from our data. Finally, the bathymetric and geographical distributions were summarized and remarks were added when necessary.

Pictures were taken with a motorized Nikon SMZ25 stereomicroscope, using NIS-Elements Microscope Imaging Software with an Extended Depth of Focus (EDF) patch.

Specimens are deposited in the University of Vigo (Spain) (Marine Zoology Laboratory) and in the Instituto Español de Oceanografía (Oceanographic Centres of Cádiz and Málaga, Spain). The holotype and one paratype of the new species are deposited in the Museo Nacional de Ciencias Naturales (Madrid, Spain); a second paratype is deposited in the Invertebrate Collection of the Marine Zoology Laboratory (University of Vigo, Spain).

TABLE 1. Station data and species collected.

Station	Date	Latitude start (N)	Longitude start (W)	Depth start (m)	Latitude end (N)	Longitude end (W)	Depth end (m)	Species
MU08	19/11/2007	20°40′19"	18°15′52"	1308	20°41′10"	18°12′59"	1308	*Parapagurus pilosimanus*
MU09	19/11/2007	20°44′44"	18°07′59"	1412	20°46′05"	18°05′08"	1412	*Parapagurus pilosimanus*
MU13	21/11/2007	20°25′35"	17°57′38"	1006	20°27′32"	18°00′00"	997	*Parapagurus pilosimanus*
MU15	21/11/2007	20°27′14"	17°51′47"	670	20°24′31"	17°50′04"	675	*Parapagurus pilosimanus*
MU19	22/11/2007	20°05′04"	17°46′18"	1222	20°02′05"	17°46′09"	1218	*Parapagurus pilosimanus*
MU21	23/11/2007	19°51′02"	17°44′20"	1453	19°53′13"	17°46′28"	1423	*Parapagurus pilosimanus*
MU23	24/11/2007	19°50′44"	17°25′25"	532	19°50′46"	17°23′48"	415	*Parapagurus pilosimanus*
MU25	24/11/2007	19°42′44"	17°28′58"	1432	19°44′56"	17°30′53"	1532	*Parapagurus pilosimanus*
MU28	25/11/2007	19°25′54"	17°19′57"	1537	19°23′04"	17°20′04"	1531	*Parapagurus pilosimanus*
MU29	25/11/2007	19°23′02"	17°12′35"	1195	19°20′47"	17°10′26"	1199	*Parapagurus pilosimanus*
MU30	26/11/2007	19°18′26"	17°16′07"	1448	19°20′34"	17°18′15"	1459	*Parapagurus pilosimanus*
MU33	27/11/2007	19°15′21"	16°59′38"	741	19°13′57"	16°57′33"	736	*Parapagurus pilosimanus*
MU34	27/11/2007	19°11′03"	17°00′17"	938	19°10′16"	16°59′01"	935	*Parapagurus pilosimanus*
MU35	27/11/2007	19°08′31"	17°09′01"	1522	19°06′14"	17°07′05"	1530	*Parapagurus pilosimanus*
MU36	27/11/2007	19°02′54"	17°03′10"	1385	18°59′58"	17°03′45"	1394	*Parapagurus pilosimanus*
MU37	29/11/2007	19°02′16"	16°50′40"	403	18°59′15"	16°50′52"	442	*Parapagurus pilosimanus*
MU49	02/12/2007	18°08′33"	16°53′01"	1546	18°11′19"	16°52′47"	1577	*Parapagurus pilosimanus*
MU53	03/12/2007	17°44′57"	16°48′43"	952	17°48′04"	16°48′27"	957	*Parapagurus pilosimanus*
MU55	04/12/2007	17°26′37"	16°54′13"	1310	17°25′58"	16°52′49"	1218	*Parapagurus pilosimanus*
MU57	04/12/2007	17°11′05"	16°47′52"	430	17°13′32"	16°47′20"	406	*Pagurus alatus*
MU60	05/12/2007	16°32′34"	17°06′28"	1512	16°29′45"	17°07′31"	1530	*Parapagurus pilosimanus*
MU61	06/12/2007	16°07′46"	17°08′22"	1440	16°10′10"	17°06′36"	1434	*Parapagurus pilosimanus*
MU63	06/12/2007	16°18′39"	16°55′12"	848	16°21′32"	16°54′59"	798	*Parapagurus pilosimanus*
MU67	07/12/2007	16°31′10"	17°04′27"	1381	16°34′09"	17°03′38"	1390	*Parapagurus pilosimanus*
MU68	07/12/2007	16°38′19"	16°59′29"	1136	16°41′10"	17°00′05"	1146	*Parapagurus pilosimanus*
MU75	10/12/2007	17°36′56"	17°00′28"	1688	17°39′58"	17°00′30"	1659	*Parapagurus nudus*
MU85	18/11/2008	20°35′48"	18°04′53"	898	20°37′56"	18°02′37"	862	*Parapagurus pilosimanus*
MU86	19/11/2008	20°44′40"	17°37′37"	91	20°41′40"	17°38′19"	103	*Dardanus arrosor*, *Pagurus prideaux*
MU87	19/11/2008	20°37′29"	17°42′37"	271	20°35′19"	17°44′55"	305	*Dardanus arrosor*

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TABLE 1. (Continued)

Station	Date	Latitude start (N)	Longitude start (W)	Depth start (m)	Latitude end (N)	Longitude end (W)	Depth end (m)	Species
MU88	19/11/2008	20°29´25"	17°39´03"	94	20°26´46"	17°40´35"	120	*Pagurus cuanensis, Pagurus prideaux*
MU96	22/11/2008	19°26´26"	17°15´23"	1297	19°23´33"	17°15´55"	1300	*Parapagurus pilosimanus*
MU107	25/11/2008	17°26´29"	16°43´48"	640	17°29´19"	16°43´05"	660	*Parapagurus pilosimanus*
MU116	28/11/2008	16°41´57"	17°08´52"	1685	16°44´51"	17°10´14"	1680	*Parapagurus nudus*
MU120	30/11/2008	16°05´49"	16°51´20"	109	16°08´23"	16°49´32"	105	*Dardanus arrosor, Pagurus alatus, Pagurus cuanensis*
MU124	30/11/2008	16°27´21"	16°45´28"	97	16°29´43"	16°43´35"	85	*Dardanus arrosor*
MU131	02/12/2008	17°00´55"	16°43´21"	102	17°03´33"	16°41´50"	104	*Pagurus cuanensis*
MU133	02/12/2008	17°08´44"	16°31´19"	87	17°11´31"	16°29´49"	87	*Pagurus cuanensis*
MU136	03/12/2008	17°16´40"	16°33´04"	103	17°19´34"	16°32´06"	112	*Dardanus arrosor*
MU137	03/12/2008	17°21´43"	16°25´29"	81	17°24´47"	16°25´00"	84	*Dardanus arrosor*
MU139	04/12/2008	17°39´19"	16°23´23"	96	17°42´25"	16°23´20"	97	*Dardanus arrosor*
MU140	04/12/2008	17°39´25"	16°38´11"	376	17°42´28"	16°38´00"	377	*Paguristes candelae*
MU142	05/12/2008	18°09´13"	16°28´17"	109	18°12´29"	16°28´34"	112	*Pagurus alatus*
MU143	05/12/2008	18°15´41"	16°35´16"	322	18°18´29"	16°36´34"	-	*Paragiopagurus macrocerus*
MU144	05/12/2008	18°17´21"	16°29´14"	119	18°20´19"	16°29´12"	138	*Pagurus alatus, Pagurus cuanensis*
MU148	06/12/2008	18°42´02"	16°36´28"	215	18°39´56"	16°38´29"	245	*Dardanus arrosor*
MU149	06/12/2008	18°47´59"	16°30´21"	93	18°51´05"	16°30´26"	146	*Dardanus arrosor, Pagurus cuanensis*
MU153	07/12/2008	18°56´13"	16°46´09"	216	18°58´56"	16°47´24"	218	*Dardanus arrosor*
MU156	08/12/2008	19°08´17"	16°39´56"	107	19°11´17"	16°39´40"	102	*Dardanus arrosor, Pagurus cuanensis*
MU158	08/12/2008	19°15´38"	16°43´32"	80	19°12´56"	16°42´10"	98	*Dardanus arrosor, Pagurus alatus*
MU161	09/12/2008	17°47´48"	16°20´46"	89	17°50´57"	16°21´16"	92	*Dardanus arrosor*
MU163	10/12/2008	18°27´26"	16°59´04"	1518	18°30´14"	16°58´15"	1516	*Parapagurus pilosimanus*
MU166	11/12/2008	18°09´24"	16°25´38"	87	18°12´19"	16°25´32"	85	*Pagurus cuanensis*
MU168	12/12/2008	19°25´20"	16°52´13"	87	19°23´20"	16°53´28"	92	*Dardanus arrosor*
MU171	12/12/2008	19°35´19"	16°59´05"	105	19°38´25"	16°58´55"	100	*Anapagurus laevis, Dardanus arrosor, Diogenes pugilator, Pagurus cuanensis*
MU173	13/12/2008	19°44´50"	17°11´02"	314	19°45´24"	17°12´22"	540	*Dardanus arrosor*
MU174	13/12/2008	19°50´01"	17°13´22"	85	19°52´17"	17°15´46"	84	*Dardanus arrosor, Pagurus cuanensis*
MU183	18/11/2009	19°40´41"	17°04´53"	138	19°39´27"	17°03´38"	177	*Dardanus arrosor*

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TABLE 1. (Continued)

Station	Date	Latitude start (N)	Longitude start (W)	Depth start (m)	Latitude end (N)	Longitude end (W)	Depth end (m)	Species
MU186	19/11/2009	19°35′44"	19°03′59"	174	19°34′06"	17°03′19"	174	*Pagurus cuanensis*
MU194	22/11/2009	20°11′00"	17°54′29"	1532	20°09′33"	17°51′54"	1575	*Parapagurus pilosimanus*
MU201	25/11/2009	20°40′33"	17°36′07"	87	20°38′49"	17°36′17"	87	*Pagurus cuanensis, Pagurus prideauxi*
MU205	27/11/2009	20°33′56"	17°33′28"	89	20°32′22"	17°36′54"	93	*Pagurus cuanensis, Pagurus prideaux*
MU206	28/11/2009	20°26′24"	17°45′13"	362	20°24′56"	17°44′16"	364	*Paragiopagurus macrocerus*
MU207	29/11/2009	20°00′54"	17°32′20"	88	19°59′52"	17°33′48"	117	*Pagurus alatus*
MU210	30/11/2009	19°24′53"	16°52′06"	86	19°23′10"	16°52′25"	90	*Anapagurus laevis, Pagurus cuanensis*
MU217	04/12/2009	16°17′47"	16°47′36"	111	16°14′11"	16°48′17"	113	*Pagurus cuanensis*
MU222	07/12/2009	17°13′22"	16°51′52"	729	17°16′16"	16°51′04"	723	*Parapagurus pilosimanus*
MU228	10/12/2009	18°01′06"	16°28′12"	136	18°01′47"	16°26′47"	172	*Pagurus cuanensis*
MU240	18/11/2010	20°26′46"	17°40′13"	106	20°28′30"	17°40′19"	108	*Dardanus arrosor*
MU260	29/11/2010	19°12′38"	16°43′31"	101	19°14′08"	16°44′20"	120	*Dardanus arrosor, Pagurus alatus*
MU266	01/12/2010	17°57′46"	16°24′13"	103	17°55′56"	16°23′46"	103	*Dardanus arrosor, Areopaguristes mauritanicus, Pagurus cuanensis*
MU283	11/12/2010	17°08′40"	16°31′34"	92	17°10′10"	16°30′32"	91	*Dardanus arrosor, Pagurus cuanensis*
MUBV01	21/11/2009	20°09′46"	17°36′52"	112	20°10′06"	17°36′51"	112	*Dardanus arrosor, Pagurus alatus, Pagurus cuanensis*
MUBV02	21/11/2009	20°07′36"	17°39′36"	318	20°07′47"	17°39′42"	330	*Dardanus arrosor, Paragiopagurus macrocerus*
MUBV03	21/11/2009	20°07′04"	17°40′48"	528	20°07′18"	17°40′54"	538	*Paragiopagurus macrocerus*
MUBV06	25/11/2009	20°45′20"	18°11′13"	1588	20°45′34"	18°11′05"	1618	*Parapagurus pilosimanus*
MUBV07	25/11/2009	20°43′34"	18°01′44"	1092	20°43′50"	18°01′38"	1122	*Parapagurus pilosimanus*
MUBV08	26/11/2009	20°44′50"	17°38′47"	174	20°45′03"	17°38′37"	168	*Pseudopaguristes marocanus, Dardanus arrosor*
MUBV10	27/11/2009	20°44′25"	17°40′07"	332	20°44′37"	17°40′16"	344	*Pseudopaguristes marocanus, Dardanus arrosor, Pagurus pubescentulus, Paragiopagurus macrocerus*
MUBV18	11/12/2009	18°28′27"	16°42′43"	559	18°28′14"	16°42′40"	574	*Paguristes candelae, Pagurus alatus, Paragiopagurus macrocerus*
MUBV19	11/12/2009	18°27′35"	16°38′02"	306	18°27′22"	16°37′58"	306	*Dardanus arrosor, Pagurus pubescentulus*
MUBV20	12/12/2009	18°28′16"	16°32′37"	155	18°28′02"	16°32′32"	155	*Dardanus arrosor, Pagurus alatus, Pagurus cuanensis*
MUBV21	23/11/2010	19°50′36"	17°17′13"	107	19°50′41"	17°17′40"	109	*Anapagurus laevis, Areopaguristes mauritanicus, Dardanus arrosor, Pagurus alatus, Pagurus cuanensis*
MUBV22	23/11/2010	19°49′07"	17°17′25"	300	19°49′14"	17°17′47"	300	*Dardanus arrosor*

The abbreviations sl, P1–5, Plp1–5, exp., stn., coll. and agg. refer to shield length, pereiopods 1 to 5, pleopods 1 to 5, expedition, station, collector and aggregate, respectively. Other abbreviations used are MU: Maurit samples hauled with commercial trawl. MUBV: Maurit samples hauled with an Agassiz trawl. IEO-CD: Invertebrate collections at the Instituto Español de Oceanografía-Cádiz (Spain). IFAN: Institut fondamental d'Afrique noire. MNHN: Museum National d'Histoire Naturelle, Paris (France). UVIGOBA3: Invertebrate collections of the Marine Zoology laboratory, University of Vigo (Spain). MNCN: Museo Nacional de Ciencias Naturales, Madrid (Spain).

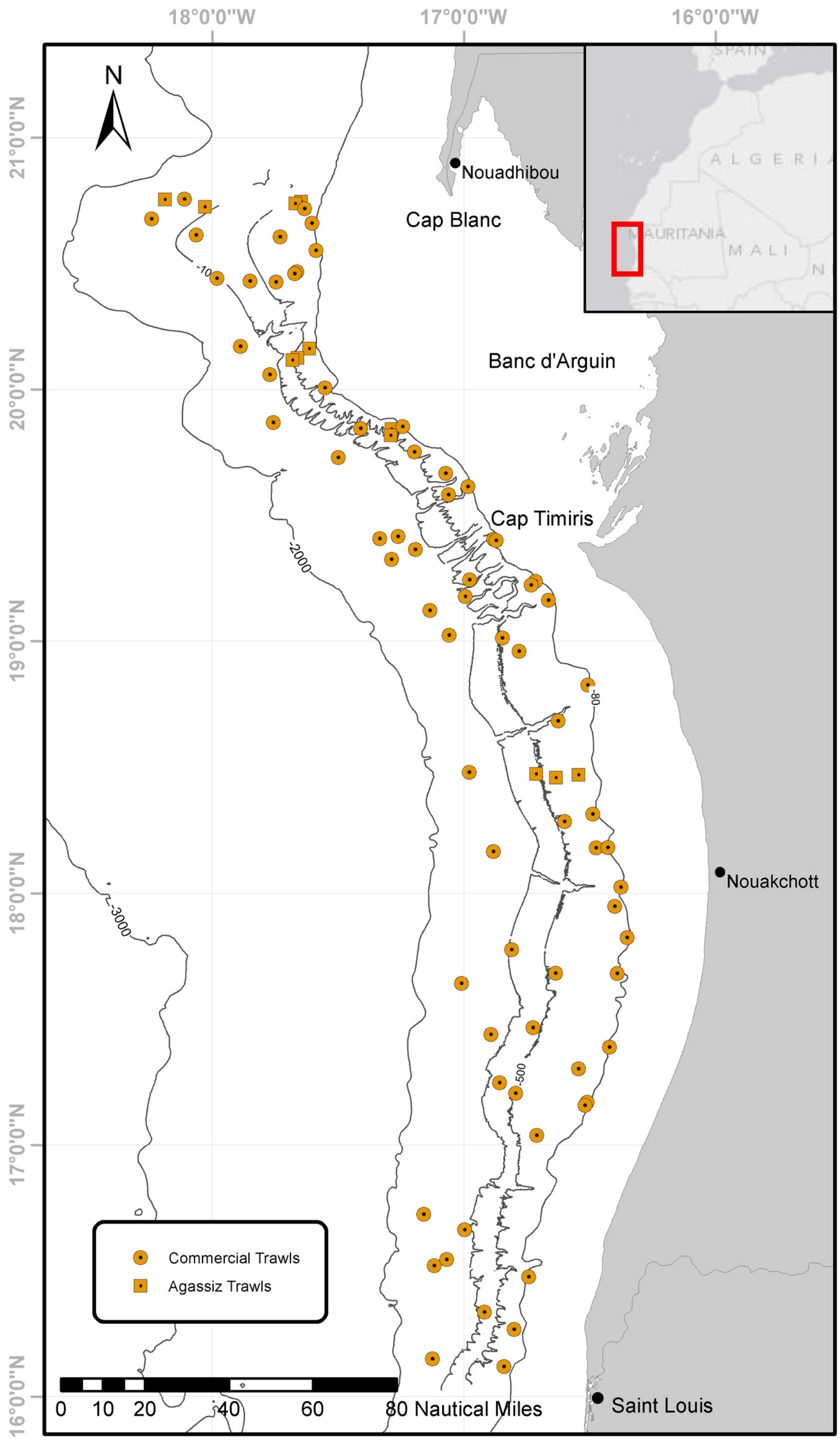

FIGURE 1. Maurit stations in which hermit crabs were sampled.

Taxonomic results

Order Decapoda Latreille, 1802

Genus *Areopaguristes* Rahayu & McLaughlin, 2010

Areopaguristes mauritanicus (Bouvier, 1906) n. comb.
(Figs. 2–4)

Paguristes mauritanicus Bouvier 1906: 186, fig. 1.—Forest, 1954a: 179, figs. 16, 31, 44, 56; 1955: 54, fig. 8, pl. 1 figs. 7–9 (ref.); 1956: 343 (syn.); 1961: 215 (in part) [Guinea to Angola, 32 to 74–49 m, not those in Gabon transferred to *P. cyanops* by Forest (1978)]; 1966: 141 (Guinea-Bissau to Gabon, 18 to 100–90 m; São Tomé and Príncipe, 4 to 10–12 m).
Paguristes skoogi Odhner, 1923: 6, pl. 1 (in part, see Forest 1956: 344).

Material examined. MU266, 103 m, (1); MUBV21, 107–109 m, (2).

Males: 2.98–3.70 mm

Type material. Holotype: Mauritanie, au large de Nouakchott, 16–24 m, 1905, no. 37, Bouvier det. [MNHN-IU-2008-14993 (= MNHN-Pg1619)], adult male, sl 3.91 mm, left and right chelipeds, both third pereiopods and left second pereiopod detached, both first pleopods missing, in a shell of the gastropod genus *Cancellaria*.

Additional material. IFAN, Senegal, M'Bao, 7.2.51, à 1 mille de la côte, 5–14 m, Delais coll., J. Forest det. 1952 [MNHN-IU-2013-13176 (= MNHN-Pg1617)]; adult male, sl 2.34 mm, entire but with left second pereiopod detached; adult female, sl 1.47 mm, left cheliped missing, inside the carcinoecium built up by the bryozoan *Hippoporidra picardi* Gautier, 1962.

IFAN-BIOLOGIE MARINE, Senegal, Baie de Gorée, 15–20 m, J. M. Marchard coll. [MNHN-IU-2013-13178 (=MNHN-Pg1620)]; adult male, sl 2.15 mm, entire; three adult females, sl 1.81, 1.82 mm (entire) and 1.99 mm (right third pereiopod missing).

FIGURE 2. *Areopaguristes mauritanicus* n. comb. Shields: left, adult male, sl: 3.70 mm (MU266; UVIGOBA3-02671); right, holotype, adult male, sl: 3.91 mm [MNHN-IU-2008-14993 (= MNHN-Pg1619)]. Scale bar, 1 mm.

FIGURE 3. *Areopaguristes mauritanicus* n. comb. Chelipeds, left (top) and right (bottom), lateral view: A, Holotype, adult male, sl: 3.91 mm [MNHN-IU-2008-14993 (= MNHN-Pg1619)]. B, adult male, sl: 3.70 mm (MU266; UVIGOBA3-02671). Scale bars A, B, 1 mm.

Habitat. Reported from muddy bottoms but also on muddy sand, sand, shell sand, coarse shell sand, gravel, shells, calcareous algae, debris, bryozoans, foraminifers and rock (Forest 1954a, 1955, 1961, 1966).

This species was reported inhabiting shells of the genera *Bullia*, *Cancellaria*, *Clavatula*, *Gibbula*, *Marginella*, *Mesalia*, *Nassa*, *Terebra*, *Trophon*, *Turritella*, etc (Forest 1954a) and in shells of *Drillia rosacea* (Reeve), *Nassa* sp, *Persicula cingulata* Dillwyn, *Clavatula rubrifasciata* Reeve, *Murex* sp., *Phos grateloupianus* Petit de la Saussaye, *Turris* sp. and *Turritella annulata* Kiener (Forest 1955, 1956).

The bryozoan *Hippoporidra picardi* Gautier, 1962 was reported as a symbiont species associated with the gastropod shells inhabited by *Areopaguristes mauritanicus* n. comb. (Williams & McDermott 2004; as *Paguristes mauritanicus*).

Our specimens were collected in shells of the genera *Fussiturris* and *Genota*.

Distribution. From Rio de Oro (SW Sahara, 21°30'N. 17°05'W) (Forest 1961) to Angola (about 16°S) (Forest 1978: 537); depth ranges from 4 m (Forest 1966: 142) to 107–109 m (present work).

Remarks. Our specimens concur with the type material examined during this study, and with the detailed description and figures given by Forest (1954a, 1955).

During the study of Maurit material we found only 12 pairs of functional gills in our specimens; no pleurobranchiae on the second thoracic segment were observed. The same gill formula was observed in the revision of the holotype and other African material from the MNHN. The genus *Paguristes* is characterized by 13 pairs of gills and Rahayu (2005) erected the genus *Stratiotes* (=*Areopaguristes*) to accommodate the species previously included in *Paguristes* with 12 pairs of gills. Following Rahayu (2005) and after the revision of the holotype, we concluded that *Paguristes mauritanicus* should be transferred to *Areopaguristes*.

Areopaguristes difficilis (Forest 1952c; as *Paguristes difficilis*) is closely related to *A. mauritanicus,* but the differences in the morphology of the chelipeds (subtriangular in *A. difficilis* versus oval in *A. mauritanicus*) and of the male first pleopods (inferior lamella two and a half times longer than wide and with distal hook-like spines distally versus about four times longer than wide and unarmed) can be used to separate both species. Forest (1978) described *Paguristes cyanops* (= *Areopaguristes cyanops*) as also closely related to *A. mauritanicus*, but the morphology of the male pleopods 1 and 2 is a reliable indication that the two species are separate. Forest (1978) described the tuft of setae on the inner face of pleopod 2 of *A. mauritanicus* with convergent setae. However, after checking the holotype, we noticed that these setae are not as convergent as those described for *A. mauritanicus* (Forest 1978: fig 13) but divergent, as those figured for *A. cyanops* (Forest 1978: fig. 11). This same divergence was observed in our specimens (Fig. 4). The morphology of pleopod 1, coincident with the description of Forest (1952c, 1978), and the ocular peduncles with a uniform and equal diameter and a white proximal colouration that becomes light red distally, upholds the identification of our specimens as *A. mauritanicus*.

Forest (1955, 1966, 1978) suggested a certain relation between latitude and depth, with a shallower distribution to the north. However, our findings from 107–109 m depth do not support this relation and constitute the deepest record for the species, similar to bathymetric records reported from Gabon and Ghana (Forest 1954a, 1966; to 100 m).

FIGURE 4. *Areopaguristes mauritanicus* n. comb. Holotype [MNHN-IU-2008-14993 (=MNHN-Pg1619)], left pleopod 2. Scale, 1 mm.

Genus *Dardanus* Paul'son, 1875

Dardanus arrosor (Herbst, 1796)
(Fig. 5)

Cancer arrosor Herbst 1796: 170, pl. 43 fig. 1.
Pagurus arrosor.—Stebbing, 1908: 22 (lit.).—Barnard, 1950: 423, fig. 79a.
Dardanus arrosor.—Schmitt, 1926: 45, fig. 69B, E, H (comp. *D. pectinatus*)—Forest, 1955: 90, fig. 19.—Macpherson, 1983: 13 (Namibia, 117 m).—Ingle, 1993: 55, figs. 17–20 (lit.).—García Raso 1996: 738 (Ibero-Moroccan Gulf, 140–524 m).

Material examined. MU86, 91–103 m, (1); MU120, 109–105 m, (5); MU124, 97–85 m, (1); MU136, 103–112 m, (2); MU137, 81–84 m, (3); MU139, 96–97 m, (3); MU148, 215–245 m, (2); MU149, 93–146 m, (1); MU156, 107–102 m, (1); MU158, 80–98 m, (2); MU161, 89–92 m, (1); MU171, 105–100 m, (1); MU173, 314–540 m, (1); MU183, 138–177 m, (1); MU240, 106–108 m, (1); MU266, 103 m, (1); MUBV19, 306 m, (6); MUBV20, 155 m, (2); MUBV21, 107–109 m, (15); MUBV22, 300 m, (1).

Males: 2.62–16.54 mm, females: 2.72–11.12 mm, ovigerous females: 3.83–5.55 mm.

FIGURE 5. *Dardanus arrosor* (Herbst, 1796). Adult male, sl: 10.23 mm (MUBV21; UVIGOBA3 02032): A, shield and cephalic appendages. B, chelipeds, left, lateral view, right dorsomesial view. Scale A–B, 1 mm.

Habitat. Ubiquitous eurybathic species distributed from coastal detritic bottoms to bathyal muds (d'Udekem d'Acoz 1999). This species was reported in muddy and sandy-mud bottoms with *Isidella* and *Funiculina* off southern Morocco; in muddy coastal shell detritic bottoms with *Veretillum* off Western Sahara and on mud and sandy mud bottoms in the Banc d'Arguin (Maurin 1968). Also recorded on 'sand of shell', 'shell remains' and 'shell remains Foram.' off N Morocco (García Raso 1996) and mainly on muddy bottoms off Namibia (Macpherson 1983).

This hermit crab was found inhabiting shells of *Argobuccinum costatum* Born, *A. giganteum* Lam., *Calliostoma granulatum* Born, *Charonia nodifera* Lam., *Dolium galea* Linné [=*Tonna galea* (Linnaeus, 1758)], *Fussus* sp, *Mesalia opalina* Adams & Reeve, *Murex cornutus* Linné, *Nassa* sp., *Natica fulminea* Gmel., *Sveltia lyrata* Brocchi and '*Xenophora senegalensis* P. Fisher (= *mediterranea* Tiber)' (Forest 1955).

The species was reported associated with many different organisms compiled by Williams and McDermott (2004), to which Schuchert (2008) added the hydrozoan species *Hydractinia pruvoti* Motz-Kossowska, 1905 (=*Podocoryna pruvoti*).

Our material was collected from sand and sandy mud bottoms, inhabiting shells of *Ranella olearium* (Linnaeus, 1758), *Tonna galea* (Linnaeus, 1758), *Fusinus* sp., *Afer pseudofusinus* Fraussen & Hadorn, 2000, *Natica* sp., *Natica canariensis* Odhner, 1932, *Genota* sp., *Nassarius arcadioi* Rolán & Hernández, 2005, *Marginella* sp., *Persicula cingulata* (Dillwyn, 1817), *Bivetiella cancellata* (Linnaeus, 1767), *Clavatula* sp., *Xenophora crispa* (König, 1825), *Calliostoma* sp. and *Natica monodi* Marche-Marchad, 1957. One specimen was found in a shelter of the sponge *Suberites* sp.

As epibionts over the shells we found the hydrozoan species *Hydractinia* sp., *Mitrocomella polydiademata* (Romanes, 1876) and *Clytia paulensis* (Vanhöffen, 1910), one sponge of the family Raspailiidae, the actiniarian *Adamsia palliata* (Fabricius, 1779), some bivalves of the family Anomiidae, some Serpulidae polychaetes and the bryozoans *Hagiosynodos* sp, and *Hippoporidra picardi* Gautier, 1962.

Distribution. Evenly distributed in the E Atlantic from the Bay of Biscay to South Africa, including the Azores, Madeira and Canary Islands and the Mediterranean Sea (d'Udekem d'Acoz 1999), but also reported in the Indo-Pacific, Japan, Taiwan and New Zealand (Asakura 2006; Yaldwyn & Webber 2011).
Subsequent records of this species fit well in this distribution (Maynou and Cartes 2000; Abelló *et al*. 2002; García Raso & Manjón-Cabeza 2002; Pipitone & Arculeo 2003; Ates *et al*. 2006; Fanelli *et al*. 2007; Pipitone & Vaccaro 2011; Muñoz *et al*. 2012).

For this species the reported depth range extends from 5–750 m (d'Udekem d'Acoz 1999) and our material was collected from 81–84 m to 314–540 m depth.

Remarks. Our specimens agree with those described by Ingle (1993). Faded specimens of *Dardanus arrosor* can be easily differentiated from *D. pectinatus* (Ortmann, 1892) by the longitudinal depression on left pereiopod 2 propodus lateral face present in *D. pectinatus* (Schmidtt 1926; Forest 1955).

Genus *Diogenes* Dana, 1851

Diogenes pugilator (Roux, 1829)

(Fig. 6)

Pagurus pugilator Roux 1829: 67 (unnumbered page), pl. 14 figs. 3–4.
Diogenes pugilator.—Forest, 1955: pg. 79, pl. 2 fig. 10 (syn. and ref.); 1956: 348, figs. 3–6; 1961: 222 (Tropical West Africa, 3–4 to 100 m).—Ingle, 1993: 46, figs. 9–12 (lit.).

Material examined. MU171, 105–100 m, (1).

Male: 1.50 mm

Habitat. This species shows a preference for medium and fine sandy bottoms (d'Udekem d'Acoz 1999) but is also reported on muddy sand, sandy mud, medium and coarse sands, debris and coralligenous bottoms (Forest 1961; Dolbeth *et al*. 2006; García-Muñoz *et al*. 2008; El Lakhrach *et al*. 2012), associated with *Posidonia oceanica* (L.) Delile, 1813 meadows (Sánchez-Jerez *et al*. 2000), in bottoms with the seaweed *Caulerpa prolifera* (Forsskål) J.V. Lamouroux, 1809 (López de la Rosa *et al*. 2002) and with *Amphioxus* sand (García Raso & Manjón-Cabeza 2002).

Diogenes pugilator shows a significant regional variability in its shell use. In Turkey, Mutlu & Ergev (2010) reported 27 inhabited gastropod species in the Levantine Sea, mostly of *Nassarius gibbulosus* (Linnaeus, 1758), *N. circumcintus* (Adams A., 1852), *N. mutabilis* (Linnaeus, 1758), *Strombus persicus* (Swainson, 1821) and *Littorina* *obtusata* (Linnaeus, 1758), while Ates *et al*. (2007) reported only shells of *Ceritium* and *Gibbula* on the Aegean coast. In southern Spain the most common gastropod shell species were *Mesalia varia* (Kiener, 1887), *Turritella communis* Risso, 1826, *Nassarius reticulatus* (Linnaeus, 1758), *Nassarius mutabilis* (Linnaeus, 1758), *Turritella turbona* Monterosato, 1877 and *Gibbula magus* Linnaeus, 1758, but another 32 species (including scaphopods and polychaete tubes) were listed by Manjón-Cabeza & García Raso (1999). In southern Portugal, *D. pugilator* was mostly found in *Nassarius* sp (as *Hinia* sp), *Turritella* sp and *Gibbula* sp. shells (Dolbeth *et al*. 2006). In the German Bight, the species was mainly found inhabiting *Littorina littorea* (Linnaeus, 1758) (plus another seven shells) (Türkay 2014), whereas on the Irish coast, McGrath *et al*. (2000) found the species mostly living in *Nassarius reticulatus* (Linnaeus, 1758), but also in *Nucella lapillus* (Linnaeus, 1758), *Littorina littorea* (Linnaeus, 1758), *L. obtusata* agg. and *Gibbula umbilicalis* (da Costa, 1778).

In West Africa the species was found in *Clavatula nifat* (Adanson) Bruguiere, *Chicoreus varius* (G. B. Sowerby II, 1834) (as *Murex varius*), *Murex* sp., *Nassa* sp., *Natica collaria* Lamarck, 1822, *Natica fulminea* (Gmelin, 1791), *Agaronia hiatula* (Gmelin, 1791) (as *Olivancillaria* (*Agaronia*) *hiatula*), *Turritella annulata* Kiener, 1843 and *Turritella* sp. (Forest 1955, 1956).

The single specimen captured during the Maurit surveys inhabited a gastropod shell of the family Nassariidae that was considerably damaged during crab extraction.

Epibiotic and free-living species associated with *D. pugilator* are the protozoan *Acinetides symbiotica* (Daday, 1907), the hydrozoan *Podocoryna exigua* (Haeckel, 1879), the plathyhelminthe *Leptoplana tremellaris* (Müller, 1774), the polychaete *Polydora ciliata* (Johnston, 1838) and the copepod *Sumaristes paguri* Hesse, 1867 (Williams & McDermott 2004). Forest (1955) found this species associated with bryozoans and with zoanthids of the genus *Palythoa*.

Distribution. This species has been reported evenly distributed in the eastern Atlantic from the western and southern Irish coasts (McGrath *et al*. 2000) and from the North Sea southwards to Angola, including the Cape Verde Islands and the Mediterranean Sea. The species was also found in the Black and Red Seas (d'Udekem d'Acoz 1999).

Further records that fit well with this distribution can be found in Sánchez-Jerez *et al*. (2000), Koçak *et al*. (2001), López de la Rosa *et al*. (2002), Pipitone & Arculeo (2003), Dolbeth *et al*. (2006), Serrano *et al*. (2006), García-Muñoz *et al*. (2008), Mutlu & Ergev (2008 and 2010), Koçak *et al*. (2010), Pipitone & Vaccaro (2011), El Lakhrach *et al*. (2012) and Türkay (2014). *D. pugilator* is reported here for the first time in Mauritanian waters.

D. pugilator has been found living mostly from the intertidal zone (d'Udekem d'Acoz 1999) to 40–50 m (Forest 1961; Türkay 2014), but also in depths of about 100 m (Forest 1961 in Nigeria; present record) and from 201 to 400 m depth (Serrano *et al*. 2006 in the Cantabrian Shelf).
A record from 1800 m depth reported by Neves (1977) was considered erroneous by d'Udekem d'Acoz (1999).

Remarks. Our specimen fits well with the description and figures given by Ingle (1993) and with the variations described and figured by Forest (1956).
Only five *Diogenes* species were reported from tropical West Africa (Barnard 1950; Forest 1955, 1956). Our specimen can be easily differentiated from *Diogenes brevirostris* Stimpson, 1858 and *Diogenes denticulatus* Chevreux & Bouvier, 1891 by the ocular acicles, whose distal margin slopes outwards and are cut into four graded processes of which the innermost is the largest and more acute versus the 10–12 similar serrations in the other two species. *Diogenes mercatoris* Forest, 1952 differs by the presence of short, strong spines disposed in transversal rows on both sides of the carapace shield, the shortness of the interocular process, and the long and dense setae on the chelipeds and ambulatory legs versus no spinose transverse rows on the shield, long interocular process and scarcely setose chelipeds and ambulatory legs in *D. pugilator*. *Diogenes ovatus* Miers, 1881 shows a conspicuous depression at the base of the left cheliped carpus housing pereiopods 2 and 3 when retracted, which is absent in *D. pugilator*.

Variability for this species was demonstrated and discussed by Forest (1955, 1956). Our specimen closely resembles those collected in Ghana and figured by Forest (1956: figs. 3A, 5), with only one difference: the presence of two small spines instead of one on the anterolateral margins of the shield. We consider that this is to be minor intraspecific variation.

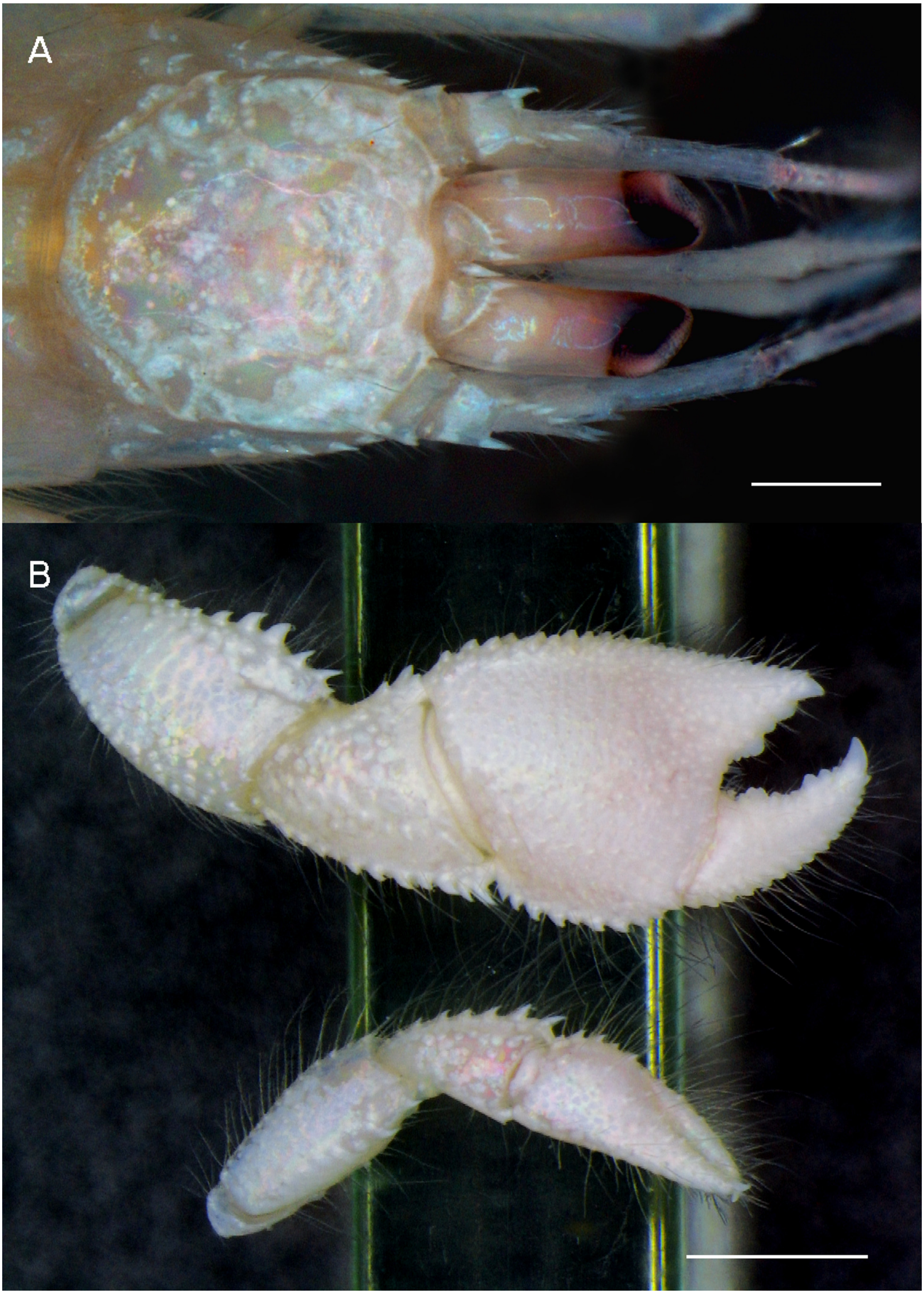

FIGURE 6. *Diogenes pugilator* (Roux, 1829). Male, sl: 1.50 mm (MU171; UVIGOBA3 13296): A, shield and cephalic appendages. B, chelipeds: left, lateral view, right, ventrolateral view. Scale: A, 0.5 mm; B, 1 mm.

Genus *Paguristes* Dana, 1851

***Paguristes candelae* n. sp.**
(Fig. 7–12)

Material examined. Holotype: Stn. MU140 (17°39'25"N, 16°38'11"W to 17°42'28"N, 16°38'00"W), 376–377 m, 4 November 2008 (MNCN 20.04/9822), male, sl 9.54 mm, entire, part of the anterior right branchiostegite is missing, inhabiting a shell of *Euthriostoma saharicum* (Locard, 1897) attached with two specimens of an unidentified actinia.

Paratypes: Stn. MUBV18 (18°28'27" N, 16°42'43"W to 18°28'14"N, 16°42'40"W), 559–574 m, 11 December 2009 (MNCN 20.04/9823), 1 female, sl 5.10 mm, entire, lacking right pereiopod 4 dactylus and half propodus, without a shell; Stn MUDR12 (19°52'38"N, 17°22'23"W), 485 m, 26 November 2010 (UVIGOBA3–02500), 1 female, sl 3.91 mm, entire, right P3 and left P2 detached, inhabiting a shell of *Nassarius wolffi* (Knudsen, 1956) (specimen added posteriorly, collected in the same area with a rock dredge).

Description. *Shield* slightly longer than broad (1.04 times); anterolateral margins weakly sloping, one spine on anterolateral angle; anterior margin between rostrum and lateral projections concave; posterior margin truncated; dorsal surface rugose with low, irregular elevations on gastric region on either side of the midline and scattered tufts of long simple setae laterally (Fig. 8A).

Rostrum short, broadly triangular, with a terminal thin spine weakly curved ventrally, falling short in relation to the lateral projections; dorsal surface with a median elevation; lateral margins smooth and furnished with long plumose setae. Lateral projections subtriangular, with small and weakly developed marginal blunt spines on the left, not developed on the right (Fig. 8B).

Branchiostegites strongly calcified (Figs. 7A, B), anterior margin smooth and furnished with long plumose setae on the left (right is missing); covering 13 pairs of biserial phyllobranchiae; pleurobranchiae above pereiopods 2–4.

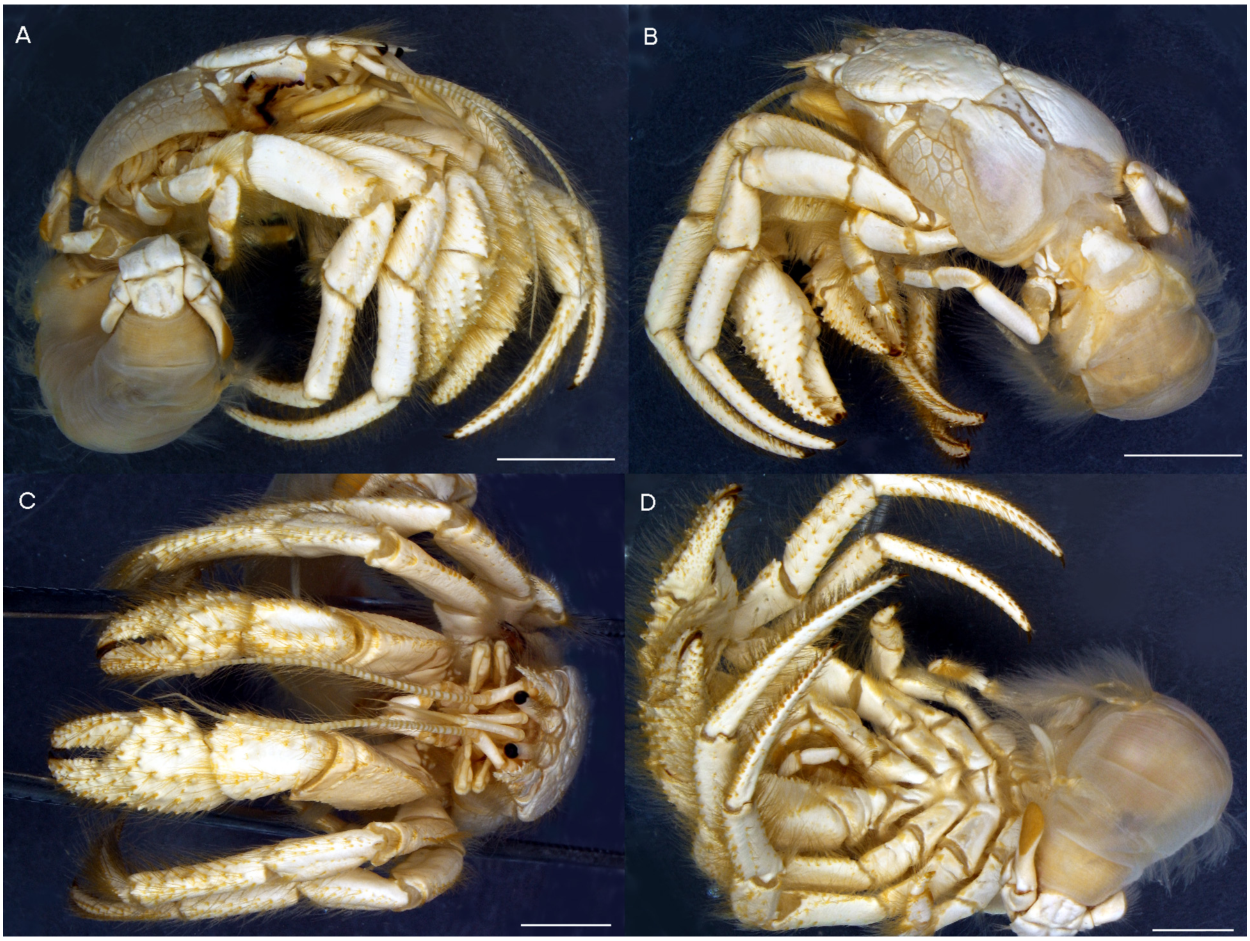

FIGURE 7. *Paguristes candelae* n. sp. Holotype male (MNCN 20.04/9822): A, general, right view. B, general, left view. C, general, frontal view. D, general, ventral view. Scale: A–B, 1 mm; C–D, 5 mm.

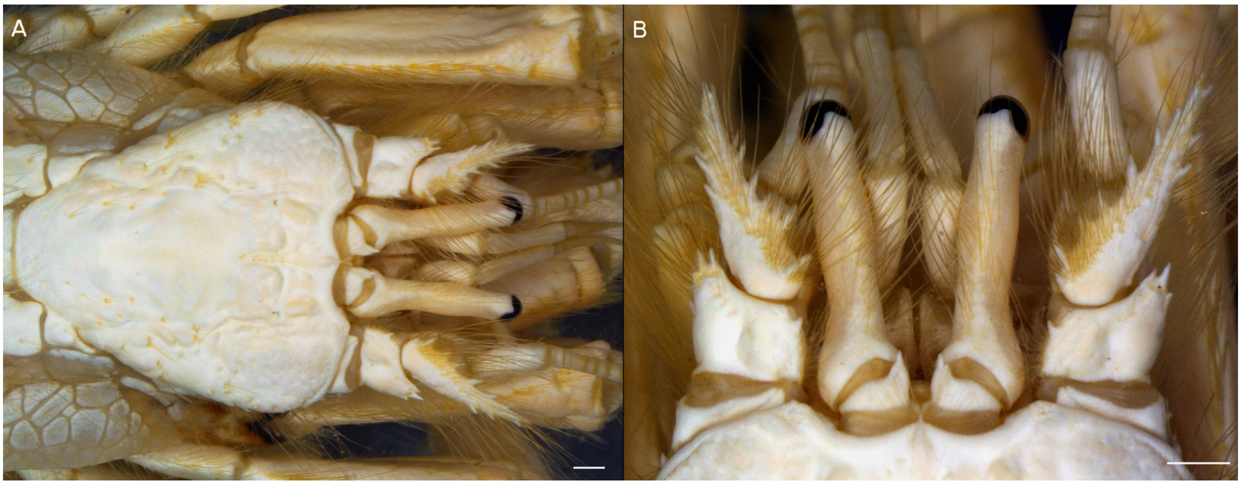

FIGURE 8. *Paguristes candelae* n. sp. Holotype male (MNCN 20.04/9822): A, shield and cephalic appendages. B, cephalic appendages, detail. Scale: A–B, 1 mm.

FIGURE 9. *Paguristes candelae* n. sp. Paratype female (MNCN 20.04/9823): A, general, frontal view. B, cephalic appendages, detail. C, chelipeds, dorsal view. D, pleomere 6 and telson, dorsal view. Scale: A–D, 1 mm.

FIGURE 10. *Paguristes candelae* n. sp. Holotype male (MNCN 20.04/9822): A, right cheliped dorsal. B, left cheliped lateroventral. C, left P2 (top) and P3 (bottom) mesial view. D, maxilliped 3 ventral view. E, right P4 carpus to dactylus lateral view. F right P5 propodus and dactylus, lateral view. Scale: A, D–F, 1 mm; B–C, 5 mm.

Ocular peduncles moderately slender (5.85 times longer than the width of cornea), about 0.54 times as long as shield, cylindrical, weakly inflated basally, cornea not dilated; both dorsal surfaces with dorsolateral tufts of long simple setae proximally and a longitudinal dorsomesial row of long simple setae (Fig. 8B).

Ocular acicles subtriangular, ending in a simple spine on the left and with an additional small spine behind the main one (Fig. 8B); mesial and lateral margins unarmed; mesial margin furnished with short plumose setae; separated by 0.3 basal width of one acicle.

*Antennular peduncles***,** when fully extended, overreach distal margins of corneas by 0.8 length of ultimate segment. Ultimate segment with a dorsal longitudinal row of scattered long, simple setae; penultimate segment without setae. Basal segment with spine on dorsolateral margin of statocyst lobe, laterodistal margin with spinule, ventromesial distal angle produced, ending in acute spine.

*Antennal peduncles***,** when fully extended, overreach cornea by 1/3 the length of the fifth segment; fifth segment unarmed; fourth segment with a small spine at dorsodistal margin; third segment with ventromesial distal angle strongly produced, ending in a strong spine; second segment with dorsolateral distal margin produced, ending in three spines almost concealed by a tuft of long simple setae, lateral margin with a small spine on the left antenna and smooth on the right one, dorsomesial angle with two distal spines, mesial row of short plumose setae; first segment with a very small laterodistal marginal spine on the left antenna, unarmed on the right one. *Antennal acicles* moderately long, slightly falling short of the distal margin of the ultimate peduncular segment, with numerous long simple setae; ending in a strong bifid spine; inflated basally; mesial margin with eight (left) or seven (right) strong spines, lateral margin armed distally with two (right) or three (left) strong spines (Fig. 8B). *Antennal flagella* three times the length of the shield, slightly exceeding the tips of chelipeds, composed of about 50 articles, each with simple setae on their distal margin; setae up to six articles long.

Third maxilliped ischium with well-developed *crista dentata* composed of moderately sized corneous teeth, without accessory tooth, ventrodistal margin and dorsolateral corner with one spine; merus with three moderate and separated ventral spines, one spine on dorsodistal margin; carpus with one spine on dorsodistal margin; dactylus shorter than propodus (Fig. 10D).

Chelipeds subequal and with similar armature, left slightly large and longer than right (Fig. 7C). Dactylus 1.5 times longer than palm, cutting edge with a row of small calcareous teeth in proximal 0.7 and a row of strong corneous teeth in distal 0.3, ending in a strong corneous claw, overlapped by a fixed finger; dorsomesial margin with an irregular row of moderately small, conical, corneous-tipped spines, decreasing in size distally, dorsal surface with scattered tufts of long stiff setae and a couple of spinulose tubercles proximally; mesial face protuberant ventrally (Fig. 10B) with scattered tufts of short setae and corneous, or only corneous-tipped, spinules; ventral surface unarmed, with tufts of stiff setae. Palm slightly shorter than carpus (Fig. 10A); dorsomesial margin with three strong, corneous-tipped spines, dorsal surface convex, without delineation of dorsolateral margin, with several irregular rows of moderately strong, corneous-tipped spines, decreasing in size on the fixed finger, and with a tuft of stiff setae; mesial surface with a couple of low protuberances distally, with tufts of long setae, mesiodistal margin unarmed; ventral surface well inflated, with row of spinulose tubercles with tufts of long setae along midline, extending onto the fixed finger, and few protuberances or tubercles laterally and mesially. Fixed finger not noticeably deflexed (Fig. 10B); dorsal surface with irregular rows of moderately strong corneous-tipped spines, decreasing in size distally; lateral margin not clearly delineated; cutting edge with row of small calcareous teeth in proximal 0.7 and row of strong corneous teeth in distal 0.3, ending in a strong corneous claw; a narrow hiatus when the claw is closed. Carpus about 0.6 times as long as merus (Fig. 10B); dorsomesial margin with an irregular row of four or five strong, conical, corneous-tipped spines, increasing in size distally; dorsal surface with single or double row of moderately strong, corneous-tipped spines at both sides of the midline and scattered tufts of long single setae; dorsodistal margin produced, with moderately small corneus-tipped spine laterally; dorsolateral margin not clearly delineated; mesial surface with tufts of setae along dorsal and distal margins; lateral surface with some scattered and moderately small tubercles, with tufts of setae; laterodistal margin with few small spines dorsally; ventral face unarmed. Merus moderately deep; dorsal surface with a row of small spinulose tubercles with tufts of long simple setae; dorsodistal margin weakly spinulose, with a spinulose transverse ridge running subdistally from lateral to mesial faces; mesial surface smooth; ventromesial margin with a row of moderately strong, corneous-tipped spines and sparse simple setae; lateral surface with scattered small tubercles and few short setae (Fig. 10B); ventral face unarmed and with a row of plumose setae distally following the ventrolateral margin; ventrolateral margin with small spine near distal corner. Ischium with a row of small spinulose tubercles, increasing in size distally, furnished with plumose setae on ventromesial margin, ventrolateral distal angle with a couple of small spines. Coxa unarmed.

Second pereiopods overreaching chelipeds by about the total length of the dactylus (Figs. 7A, 9A). Dactylus about 0.6 times longer than propodus; weakly curved in lateral view, nearly straight or slightly twisted in dorsal view; ending in a strong, curved, corneous claw; each dorsal surface with a row of small to moderately small corneous-tipped spines, becoming smaller distally, partially obscured by numerous tufts of long setae; each mesial face with two rows of tufts of setae dorsally and ventrally (Fig. 10C); lateral faces with two rows of sparse tufts of setae subdorsally and subventrally; each ventral margin with a row of about 30 small corneous spines anteriorly directed, increasing in size distally. Propodus distinctly longer than carpus; dorsal surfaces each with a more or less irregular row of strong, corneous-tipped spines mesially, less numerous on left pereiopod, partially obscured by tufts of long setae; dorsodistal margins with a spine; mesial surfaces with two entire rows of tufts of long setae dorsally and ventrally and one short row of scattered tufts of long setae on the proximal midline; lateral surfaces unarmed, each one with a row of tufts of long setae near the dorsal and ventral margins and also on the midline; ventral surfaces unarmed, each with an irregular row of tufts of long setae. Carpus dorsal surface with a row of strong, corneous-tipped spines mesially and tufts of long setae (Fig. 10C), dorsodistal margin with a strong corneus-tipped spine; mesial surfaces smooth; lateral faces convex, each one with shallow longitudinal sulcus irregularly lined with scattered tufts of long simple setae, median scattered tufts of long simple setae and one row of lateroventral tufts of long simple setae; smooth ventral surfaces with a couple of tufts of short simple setae; ventrodistal margins with some long simple setae and a few short plumose setae. Merus strongly compressed laterally; each dorsal surface with a row of tufts of long simple setae; mesial and lateral surfaces smooth; each ventral surface with a mesial row of small spines or spinules and numerous long simple setae with some short plumose setae, ventrolateral angle furnished with two short plumose setae. Ischium dorsal surfaces with a row of spinules and some short plumose setae, dorsodistal margins with a short spine; ventral margins with a distal row of long plumose setae. Coxa unarmed other than with small spines on ventrolateral and ventromesial distal angles.

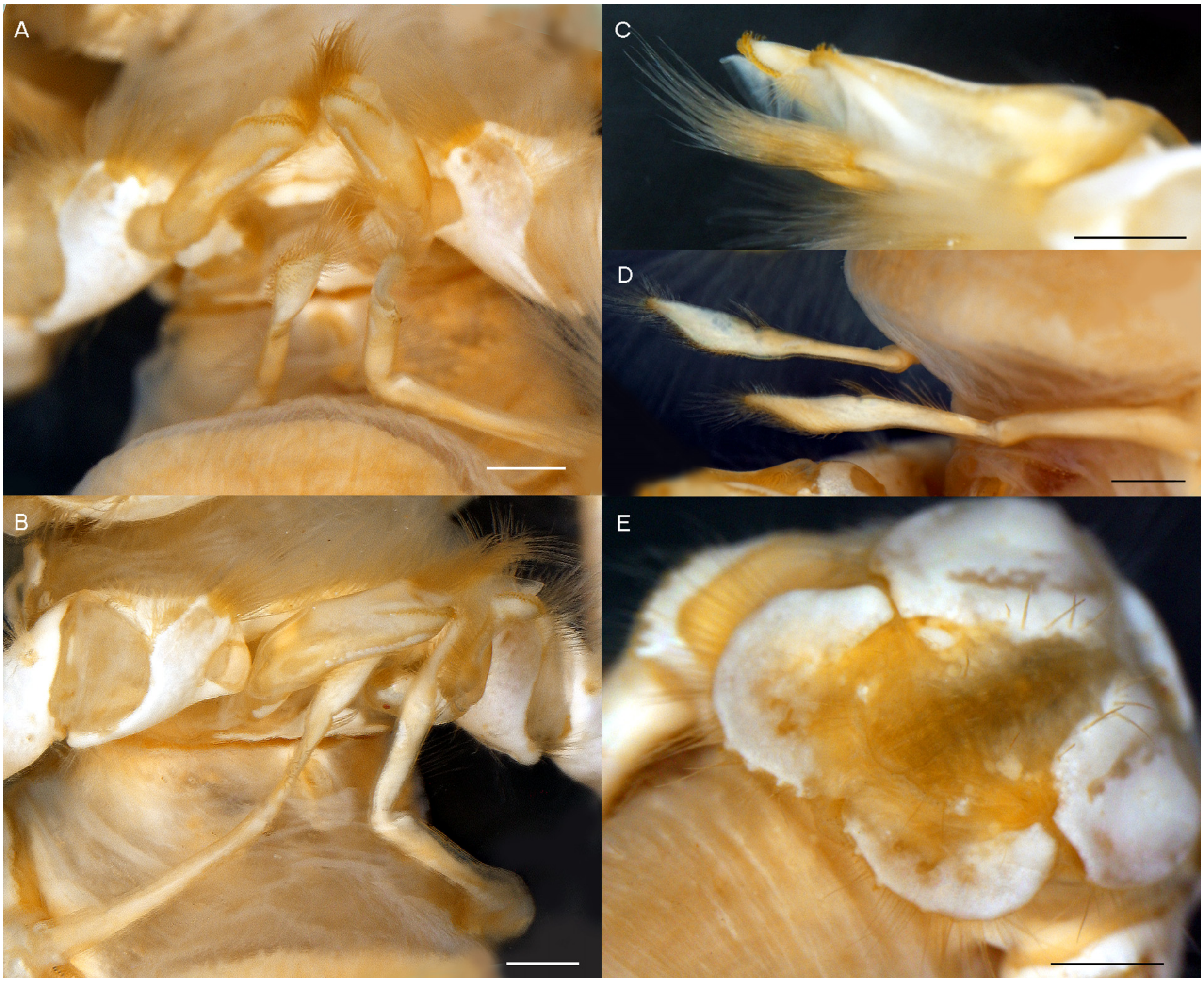

FIGURE 11. *Paguristes candelae* n. sp. Holotype male (MNCN 20.04/9822): A, Plp1, Plp2 ventral view. B, Plp1, Plp2 ventrolatera view. C, Plp1 lateral view. D, Plp2 lateral view. E, telson. Scale 1 mm.

Third pereiopods mostly similar to second in setation (Figs. 7A, 9A). Dactylus with a proximal single row of small corneous-tipped spines and small corneous spines distally on dorsomesial margin; each mesial surface with a single or a double row of small corneous spines ventral to midline (Fig. 10C); each ventral surface with a row of about 30 small corneous spines anteriorly directed, flanked by two rows of tufts of long setae. Propodus unarmed. Carpus with a dorsal row of 2 or 3 spines proximally and a subdistal dorsal spine; mesial faces with one mediodistal tuft of setae (Fig. 10C). Merus unarmed apart from a few spinules proximally on dorsal surfaces. Ischium with some barely noticeable spinules on dorsal surface and a very small subdistal spinous low tubercle. Coxa unarmed on dorsal and ventral margins.

Fourth pereiopods setose on dorsal and ventral margins. Dactylus weakly curved, ending in a strong corneous claw, without preungal process (Fig. 10E); dorsal surface unarmed; ventral surface with a lateral row extending to 0.7–0.8 length of ventral margin and composed of 6 or 7 corneous teeth. Propodal rasp formed by 5–6 rows of ovate scales (Fig. 10E). Carpus and merus unarmed.

Fifth pereiopods chelate, setose. Dactylus covered with ovate scales (Fig. 10F). Propodus with a well-developed rasp (Fig. 10F). Each coxa with a gonopore.

*Pleopods***.** First and second pleopods paired and modified (Figs. 11A, 11B). First pleopod robust, inferior lamella with the distal rounded margin furnished with 2–3 rows of hook-like spines (Fig. 11C); external lobe with a curved tip and separated from the internal lobe by a wide rounded notch (Fig. 11C); broad internal lobe with long setae distally (Figs. 11A, 11C). Second pleopod uniramous (Fig. 11D). Third to fifth pleopods unpaired, exopods very well developed, endopods rudimentary.

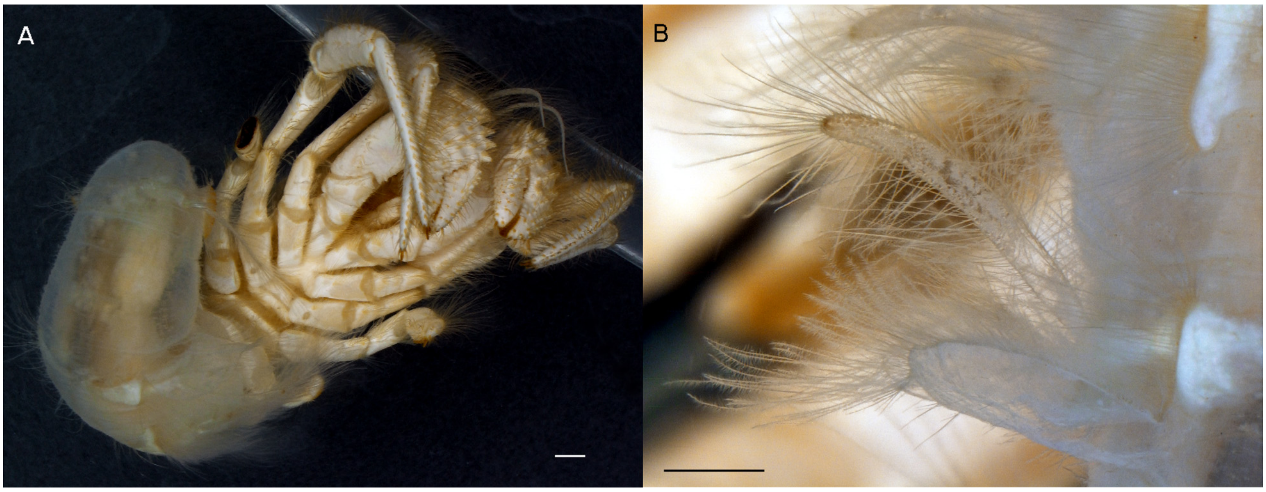

FIGURE 12. *Paguristes candelae* n. sp. Paratype female (MNCN 20.04/9823): A, general, ventral view. B, brood pouch and plp4, detail. Scale 1 mm.

Abdominal tergites. Second and third abdominal tergites moderately calcified on their left (Fig. 7B), with long plumose setae on the left margins; fourth abdominal tergite widely separated from the third tergite, with moderately long plumose setae.

Uropods strongly asymmetrical (Fig. 9D); each protopod with a few small corneous-tipped spines on its posteroventral margin.

Telson with posterior lobes somewhat asymmetrical, left lobe larger than the right; broadly rounded; separated by a wide median cleft; terminal margins with short broad spines, 7 (left) and 6 (right) (Fig. 11E); deep transverse indentations (as in Fig. 9D); anterior lobes unarmed on their lateral margins.

Females. Differences other than those attributed to sex: relative length of the antennal penduncle that falls short of distal cornea; absence of subterminal spine in the ocular acicles (Fig. 9B); spines on ventrolateral and ventromesial distal angles on pereiopod 2, coxae almost inconspicuous; pereiopods 2 and 3 with the dactylus ventral margin furnished with fewer anteriorly directed corneus spines (about 20); pereiopod 4 with only five corneus teeth in the dactylus ventrolateral row; and telson with nine thinner marginal teeth on each lobe (Fig. 9D). Females show paired gonopores (Fig. 12A); first pleopods paired, uniramous; second to fifth pleopods unpaired, second to fourth with both rami well developed, exopods much longer than endopods and fifth pleopod shorter, with the exopod well developed and a vestigial endopod. Brood pouch moderately large, subtriangular, with smooth margins furnished with long plumose setae (Fig. 12B).

Etymology. Devoted to Candela, the daughter of the first author.

Remarks. To date 18 species have been assigned to *Paguristes* in West Africa, seven of which were transferred to *Areopaguristes* (Rahayu 2005, present work) and one to *Pseudopaguristes* (present work). The type material of the other ten species must be checked in order to clarify their taxonomic status, as suggested by McLaughlin (2002) and Rahayu (2005).

There are no indications of the gill number in the other ten *Paguristes* species in the literature, but *P. candelae* n. sp can be clearly differentiated by other features, including the multidentate ocular acicles (more than 3 spines) of *Paguristes fagei* Forest, 1952, *Paguristes insularis* Forest, 1966, *Paguristes microphthalmus* Forest, 1952, *Paguristes oxyacanthus* Forest, 1952 and *Paguristes skoogi* Odhner, 1923; the relative length of the rostrum, the antennal acicle and the antennal peduncle, as well as the morphology of chelipeds, and pereiopods 2 and 3 of the species *Paguristes agulhasensis* Forest, 1954a, *Paguristes barnardi* Forest, 1954a, *Paguristes gamianus* (H. Milne-Edwards, 1836), *Paguristes macrotrichus* Forest, 1954a and *Paguristes rubropictus* A. Milne-Edwards & Bouvier, 1892. Moreover, the presence of two gonopods in females was only described for *P. gamianus* and *P. rubropictus*, although this detail is unknown for *P. agulhasensis* (only one male was ever reported) and for *P. barnardi*, *P. macrotrichus* and *P. skoogi* because this feature was never specified; in the other species, females have only one gonopore on left third pereiopod.

Paguristes eremita (Linnaeus, 1767), *Paguristes streaensis* Pastore, 1984 and *Paguristes syrtensis* de Saint Laurent, 1971, also reported from E Atlantic and the Mediterranean Sea, have a rostrum that exceeds the lateral projections and granular chelipeds, whereas in *Paguristes candelae* n. sp. the rostrum falls short of the lateral projections and the chelipeds have strong corneus-tipped spines.

We also checked the descriptions of the 31 species currently referred to as *Paguristes sensu lato* from the western Atlantic Ocean (A. Milne-Edwards 1880; A. Milne-Edwards & Bouvier 1893; Benedict 1901; Schmitt 1933; Forest 1954b; Holthuis 1959; Provenzano 1965; McLaughlin & Provenzano Jr. 1974, 1975; Campos & Sánchez 1995; Sandberg, 1996; Manjón-Cabeza *et al*. 2002); none of them concurred with the above-mentioned combination of features observed in our specimen, related to the rostrum, antennal acicles, cheliped morphology and telson armature.

Genus *Pseudopaguristes* McLaughlin, 2002

Pseudopaguristes marocanus (A. Milne-Edwards & Bouvier, 1891) n. comb.

(Fig. 13)

Paguristes Marocanus A. Milne-Edwards & Bouvier, 1891: 151.

Paguristes marocanus.—A. Milne-Edwards & Bouvier, 1892: 207; 1900: 167, pl. 23 figs. 1–6.—Forest, 1954a: 175, figs. 14, 29, 42 and 45.

Material examined. MUBV08, 174–168 m, (41); MUBV10, 332–344 m, (1).

Males: 2.11–4.51 mm, females: 2.25–2.55 mm, ovigerous females: 2.22–3.52 mm

Type material. "Talisman", 13 July 1883, no. 91, 115–140 m, lat. 21°51'N, long. 19°48'W, north of Banc d'Arguin, Sahara coasts, muddy sand, Milne-Edwards & Bouvier det. [MNHN-IU-2008-14991 (= MNHN-Pg1612)], adult male, sl 2.31 mm, entire but third pereiopod detached, with a shell of the gastropod *Turritella wareni* Ryall & Vos, 2010.

Additional material. Côtes du Sahara, 1884, De Cuverville coll. [MNHN-IU-2013-11300 (= MNHN-Pg1614)], adult male, sl 2.25 mm, left second pereiopod and both third pereiopods missing, proximal abdomen translucent.

Description. The females, not previously described, are morphologically similar to the males with no major differences other than those attributed to sex. Females are smaller, with one gonopore on each P3 coxa, paired uniramous first pleopods and the brood pouch represented by dense plumose setae; ovigerous females with few (up to 9) but large (average = 0.79 mm) eggs.

Habitat. Reported from bottoms of sand, shells and corals (A. Milne-Edwards & Bouvier 1900: 169). The species was reported in a left coiled shell of *Fusinus maroccensis* (Gmelin, 1791) (A. Milne-Edwards & Bouvier 1891, 1892, 1900; as *Sinistralia Maroceana*, *Fusus marocanus* and *Sinistralia Marocana* respectively) and in a right coiled 'turritelle' shell (A. Milne-Edwards & Bouvier 1900) here identified as *Turritella wareni* Ryall & Vos, 2010. All our specimens were without a shell.

Distribution. Western Sahara (A. Milne-Edwards & Bouvier 1900; Forest 1954a) and off Mauritania (Cap Blanc) (present work) in depths from 115–140 m (A. Milne-Edwards & Bouvier 1900: 169) to 332–344 m (present work). This is the first record since the original description and the first record of the species in Mauritanian waters.

Remarks. The original description of *Pseudopagurus marocanus* n. comb. included only a short diagnosis within the report of the first hermit crab inhabiting a left coiled shell (Milne-Edwards & Bouvier 1891). The same short description was included in the preliminary report of the hermit crabs collected by the *Travailleur* and the *Talisman* (A. Milne-Edwards & Bouvier 1892), but a detailed description and some figures of the species, based on five specimens collected by the *Talisman* in 1883, were not provided until 1900 (Milne-Edwards & Bouvier 1900). Of these five collected specimens, only two are now deposited in the MNHN and were reviewed for this work: one male from 26°N, 17°08'W (caught off Cap Bojador, at 130 m depth) figured by Milne-Edwards & Bouvier, 1900 (see Forest 1954a), and another male from 21°51'N, 19°48'W (north of Banc d'Arguin, but off W Sahara coasts, at 115–140 m). The location of the other three specimens, one male from 21°51'N, 19°48'W (135–290 m) and another two specimens from 21°51'N, 19°48'W (115–140 m, no sex specified) is unknown. One male collected by Cuverville in the western Sahara was deposited in MNHN, Paris (Forest 1954a) and was also reviewed here as additional material.

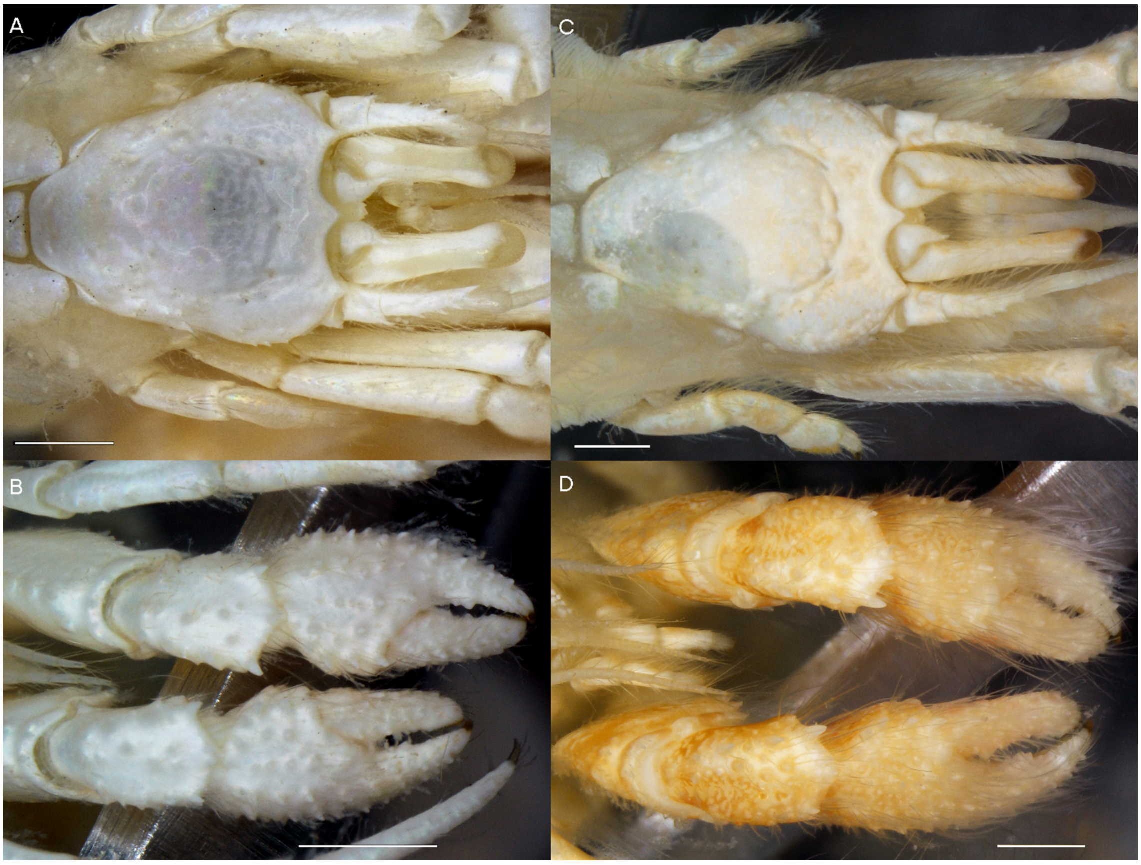

FIGURE 13. *Pseudopaguristes marocanus* (A. Milne-Edwards & Bouvier, 1891) n. comb. Type, adult male, sl: 2.31 mm [MNHN-IU-2008-14991 (=MNHN-Pg1612)]: A, shield and cephalic appendages. B, chelipeds, left up, right down. Adult male, sl: 4.51mm (MUBV10; UVIGOBA3-12151): C, shield and cephalic appendages. Adult male, sl: 3.34 mm (MUBV08; UVIGOBA3-11844): D, chelipeds, left up, right down. Scale: A, 0.5 mm; B–D, 1 mm.

Despite the limited number of specimens mentioned in the literature, this species was very abundant at station MUBV08, where 237 specimens were captured (41 preserved for further study). All these specimens coincide with those described by A. Milne-Edwards & Bouvier (1900) and Forest (1954a) as *Paguristes marocanus* and we were certain about their identification. However, in all the examined specimens, including the type and additional material from MNHN of Paris, we found only eight pairs of functional gills, no arthrobranchiae on thoracic segment 3 (over maxilliped 3) and very reduced or absent on segment 4 (over chelipeds), and pleurobranchiae absent on thoracic segment 5 (over pereiopod 2).

The genus *Pseudopaguristes* was erected by McLaughlin (2002) for those species closely related to *Paguristes* but with eight pairs of functional phyllobranchiae; subsequently, Rahayu (2005) amended the diagnosis and transferred some species previously included in *Paguristes* to *Pseudopaguristes*.

In agreement with these authors, and after reviewing the type material, we conclude that *Paguristes marocanus* should be included in genus *Pseudopaguristes*, as *Pseudopaguristes marocanus* n. comb.

Our male specimens agree with the type material checked during this study but we noticed some variation in the eyestalk and cornea related with size. In the small specimens the eyestalk is shorter and stout with a more inflated cornea, whereas in bigger specimens the eyestalk is slender and the cornea is not so dilated. In addition we decribed here the females of this species for the first time.

Our records of *Pseudopaguristes marocanus* n. comb. off Cape Blanc are the southernmost and deepest ever reported.

Genus *Anapagurus* Henderson, 1886

Anapagurus laevis (Bell, 1846)

(Fig. 14)

Pagurus laevis Bell, 1846: 184, 185, unnumbered figure.

Anapagurus laevis.—Ingle, 1993: figs. IIIA, 42–45.—García Gómez, 1994: 13, figs. 2, 3, 44g (lit.).—García Raso, 1996: 738 (Ibero-Moroccan, 170 to 518–526 m).

Not *Anapagurus laevis*.—Forest, 1955: 131, figs. 31, 32, pl. VI figs. 7–8, pl. VI fig. 6 (see García-Gómez 1994).—Forest, 1961: 239, figs. 8, 12, 16 (see García-Gómez 1994)

Material examined. MU171, 105–100 m, (1); MU210, 86–90 m, (1); MUBV21, 107–109 m, (51).

Males: 2.05–4.19 mm, ovigerous females: 2.11–2.32 mm

Habitat. Mainly a circalittoral species in coastal detritic bottoms, but also reported on hard and soft bottoms from 5 to 1262 m (d'Udekem d'Acoz 1999); García Raso & Manjón-Cabeza (2002) found the species on *Amphioxus* sand.

The gastropod and scaphopod shells inhabited by this species were summarized by García Gómez (1994).

The following organisms have been reported attached to the outside of the shells inhabited by *A. laevis*: the poriferan *Suberites domuncula* (Olivi, 1792); the hydrozoans *Podocoryna areolata* (Alder, 1862), *Podocoryna borealis* (Mayer, 1900) and *Podocoryna carnea* Sars, 1846; the actinian *Paracalliactis lacazaei* Dechancé & Dufaure, 1959; the zoanthids *Epizoanthus incrustatus* Düben & Koren, 1847 and *Epizoanthus paguricola* (Roule, 1900); the polychaetes *Nereis fucata* (Savigny) and Serpulidae indet; and the cirriped *Balanus* sp. (García Gómez 1994; Williams & McDermott 2004).

Our specimens were found on sandy bottoms, mainly inhabiting carcinoecia of the zoanthid *Epizoanthus incrustatus* Düben & Koren, 1847, although two specimens were found in the gastropod shells of *Linatella caudata* (Gmelin, 1791) and in a damaged Nassariidae shell.

Distribution. *A. laevis* has been collected in the eastern Atlantic from off Trondheimsfjord (Norway) to off Mauritania and the western Mediterranean (d'Udekem d'Acoz 1999).

Some records from the central and eastern Mediterranean were transferred to other species or their identification was considered questionable by García Gómez (1994). Nevertheless, the species was subsequently reported from Turkey (Koçak *et al*. 2001; Ates *et al*. 2006) and from Sicily and Italy (Pipitone & Arculeo 2003; Fanelli *et al*. 2007). Other records in Abelló *et al*. (2002), García Raso & Manjón-Cabeza (2002), Serrano *et al*. (2006), Sánchez *et al*. (2008), Cartes *et al*. (2009), Serrano *et al*. (2011), Papiol *et al*. (2012) and Ellis *et al*. (2013) fit well with the distribution.

In Mauritania, the species was previously recorded off southern Mauritania, at 80 m (Chevreux & Bouvier 1892) and off Cap Blanc, at 105 m (García Gómez 1994). Our specimens were captured in the vicinity of Cape Timiris between 86 and 109 m.

Remarks. Our specimens agree well with those described and figured by Ingle (1993) and García Gómez (1994). Laterodistal tufts with 2 or 3 setae on the ultimate antennular segment, the same inclination of all the dorsomesial spines (including the distal) on the carpus of right cheliped and the short, submarginal stiff setae in the telson support the identification of our specimens as *A. laevis* rather than as the closely related species *A. vossi* García Gómez, 1994. The strongly expanded ocular acicle mesial margins and the different-sized spines on the right cheliped carpus dorsomesial row of spines, easily distinguish our specimens from the related species *A. congolensis* García Gómez, 1994.

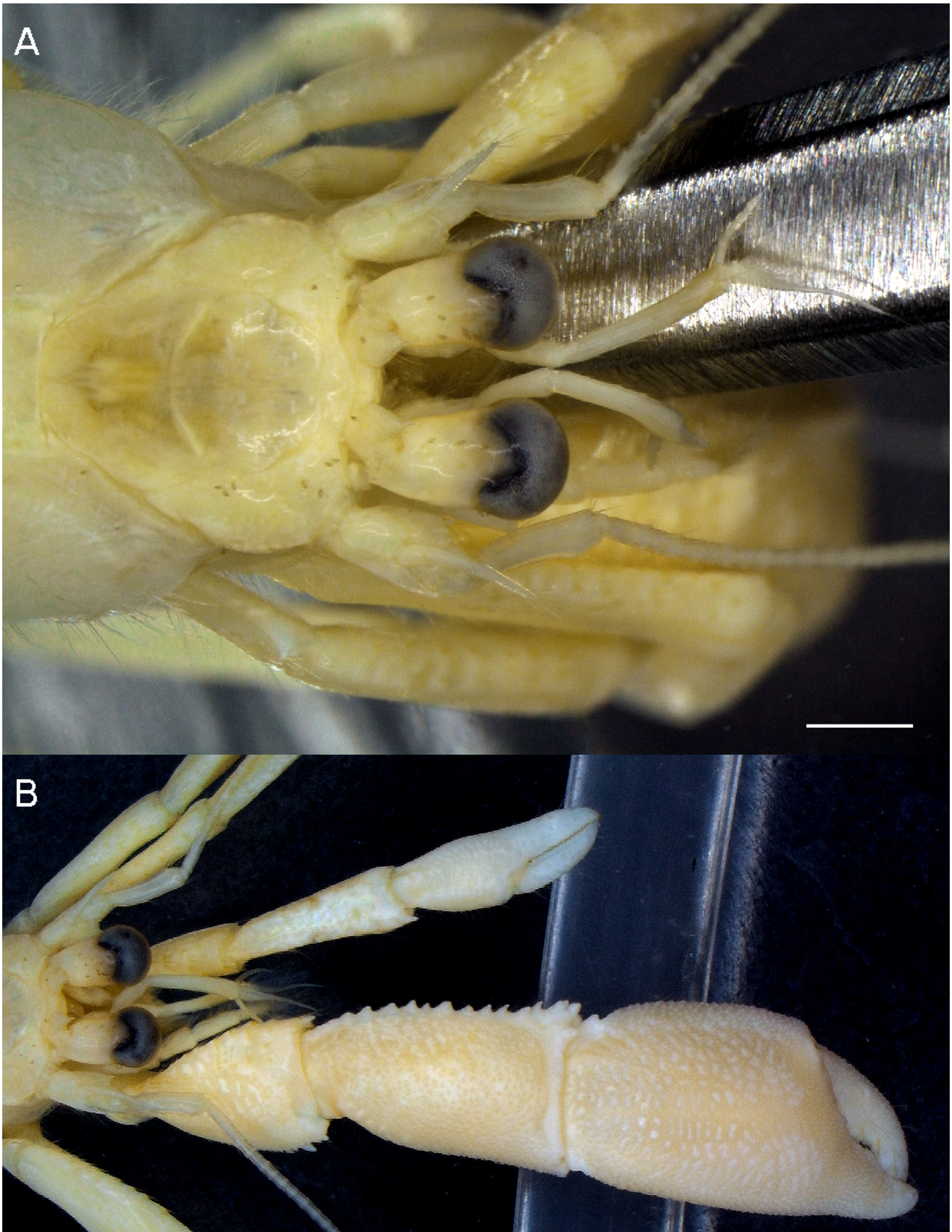

FIGURE 14. *Anapagurus laevis* (Bell, 1846). Adult male, sl: 3.01 mm (MUBV21; UVIGOBA3 02036): A, shield and cephalic appendages. B, chelipeds: left, dorsolateral view, right lateral view. Scale A–B, 1 mm.

Genus *Pagurus* Fabricius, 1775

Pagurus alatus Fabricius, 1775
(Fig. 15)

Pagurus alatus Fabricius, 1775: 411.
Eupagurus variabilis Milne-Edwards & Bouvier, 1892: 217.—Selbie, 1921: 36, pl. IV figs. 4, 5, pl. V figs. 1–3.
Pagurus alatus.—Ingle, 1985: 765 (key); 1993: 33 (key) 136, figs. 109–112 (lit.).
not *Eupagurus alatus.*—Forest, 1955: 110, fig. 23, pl. V figs. 2 and 3 (= *P. excavatus*)
not *Pagurus alatus*.—Zariquiey, 1968: 247, figs 89e, 90b, o, 91e (= *P. excavatus*)

Material examined. MU57, 430–406 m, (1); MU120, 109–105 m, (1); MU142, 109–112 m, (1); MU158, 80–98 m, (2); MU207, 88–117 m, (1); MU260, 101–120 m, (1); MUBV20, 155 m, (5); MUBV21, 107–109 m, (31).

Males: 3.06–6.56 mm, females: 3.10–3.40 mm, ovigerous females: 3.01–4.03 mm

Habitat. This species is characteristic of bathyal muds (d'Udekem d'Acoz 1999; Follesa *et al*. 2009; Mura *et al*. 2006), but is also reported on sand (Pipitone & Arculeo 2003) and on bottoms of sand, silt, coarse sands and gravel by Serrano *et al*. (2011).

Pagurus alatus was found inhabiting shells of the gastropod species *Colus islandicus* (Mohr, 1786) in Cap Breton Canyon (Bay of Biscay) (Urzelai *et al*. 1990). In symbiosis with this crab were the cnidarians *Adamsia palliata* (Müller, 1776), *Calliactis parasitica* (Couch, 1842), *Epizoanthus paguriphylus* Verrill, 1883, *Paracalliactis mediterranea* Ross and Zamponi, 1982 and the polychaete *Neanthes fucata* (Savigny, 1818) (Williams & McDermott 2004).

Our specimens were collected mainly on sandy bottoms, but also on sandy-mud bottoms. They were found inhabiting shells of the gastropods *Aspa marginata* (Gmelin, 1791), *Calliostoma granulatum* (Born, 1778), *Euspira grossularia* (Marche-Marchad, 1957), *Euspira subplicata* (Jeffreys, 1885), *Nassarius arcadioi* Rolán & Hernández, 2005, *Natica canariensis* Odhner, 1932, *Ranella olearium* (Linnaeus, 1758) and in a shell of the genus *Genota*. As epibionts over gastropod shells we found Demospongia, two different actinian species, some specimens of Anomiidae bivalves, one acorn barnacle and some tubes of Serpulidae polychetes. Over the chelipeds and ambulatory legs we identified the hydrozoan *Leuckartiara octona* (Fleming, 1823).

Distribution. Eastern Atlantic, from Iceland, Norway, the Shetland Islands and the North Sea southwards to Mauritania, including the Canary Islands and the Mediterranean Sea (d'Udekem d'Acoz 1999). The record from Loos Islands (Guinea) (Forest 1955) belong to *P. excavatus* (see remarks). Bathymetrical range varies from 5–10 m (Pipitone & Arculeo 2003) to 1430–1505 m (García Raso 1996), although the species is mainly found around 150 m depth (d'Udekem d'Acoz 1999).

Further records were from the Bay of Biscay (Urzelai *et al*. 1990; Serrano *et al*. 2006; Cartes *et al*. 2007; Sánchez *et al*. 2008; Serrano *et al*. 2011), off Portugal (Monteiro *et al*. 2001) and the Mediterranean Sea (Koçak *et al*. 2001; Abelló *et al*. 2002; Biagi *et al*. 2002; Pipitone & Arculeo 2003; Colloca *et al*. 2004; Company *et al*. 2004; Ungaro *et al*. 2005; Mura *et al*. 2006; Ates *et al*. 2006; Fanelli *et al*. 2007; Cartes *et al*. 2009; Follesa *et al*. 2009; Papiol *et al*. 2012).

Remarks. Our specimens coincide with the descriptions and figures given by Ingle (1993).

The taxonomic status of *P. alatus*, *P. excavatus* and *P. variabilis* has been controversial for many years. The differences between *P. excavatus* and *P. variabilis* were established by A. Milne-Edwards & Bouvier (1900). Following that opinion, Selbie (1921) indicated that the most reliable features to separate both species were the number of unpaired pleopods in males (three in *P. variabilis* and four in *P. excavatus*) and the length of the dorso-outer process of the antennal peduncular segment 2 that reaches, or passes, the base of the terminal joint in *P. alatus* but not in *P. excavatus*.

Forest (1955: 109) also followed this differentiation, considering *P. excavatus* to be identical to *P. alatus* (the latter name having priority) and different from *P. variabilis*. This author also indicated the presence of two *Pagurus* (as *Eupagurus*) groups in West Africa, the first group including *P. alatus*, with four unpaired pleopods in males (a feature of the current concept of *P. excavatus*), and the second group, including *P. variabilis*, with three unpaired pleopods in males (a feature of the current concept of *P. alatus*). Forest opinion was shared by Zariquiey (1968).

Based on Selbie (1921), Ingle (1985) indicated that there were no consistent records of *P. excavatus* north of the southern part of the Bay of Biscay. Taking into account that *P. alatus* was described after material collected in Iceland, Ingle concluded that *P. alatus* and *P. excavatus* were two different species and reinstated *P. excavatus* as a valid species. In addition, Ingle (1985) considered *P. variabilis*, whose distribution was more boreal, to be a junior subjective synonymy of *P. alatus*.

Ingle (1993) provided a complete synonymy for *P. alatus* and *P. excavatus*, which is currently accepted. Nevertheless, the report of *P. alatus* in Forest (1955) from Loos Islands and Zariquiey (1968) from the Iberian Peninsula should be definitively included in *P. excavatus*.

FIGURE 15. *Pagurus alatus* Fabricius, 1775. Adult male, sl: 6.56 mm (MU57; UVIGOBA3 04737): A, shield and cephalic appendages. B, chelipeds: left (top), dorsomesial view, right (bottom) lateral view. Scale: A, 1 mm; B, 5 mm.

***Pagurus cuanensis* Bell, 1846**
(Fig. 16)

Pagurus cuanensis Bell, 1846: 178, unnumbered figure.

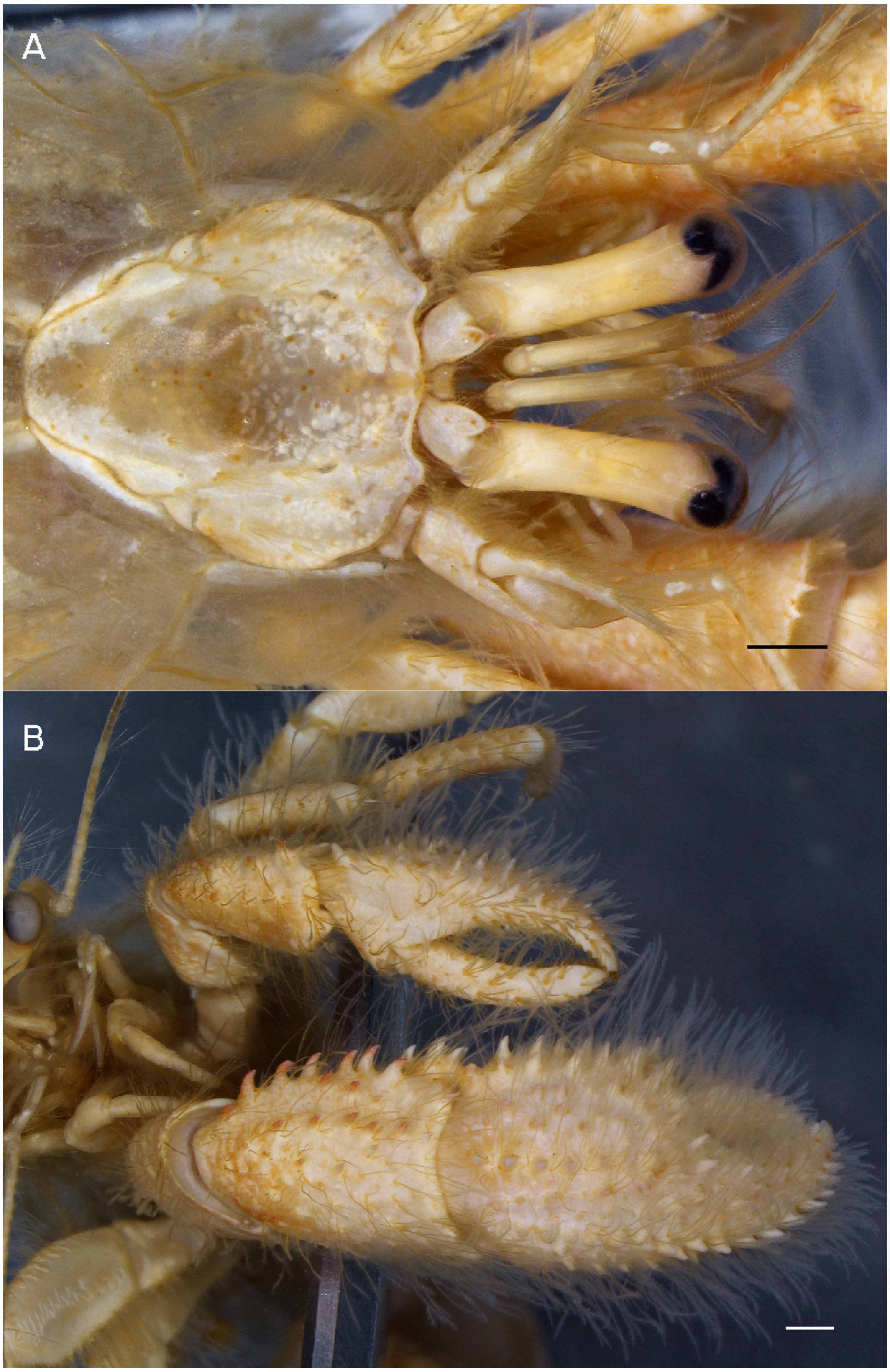

FIGURE 16. *Pagurus cuanensis* Bell, 1846. Adult male sl: 5.15 mm (MUBV20; UVIGOBA3 11840): A, shield and cephalic appendages. B, chelipeds: left, dorsomesial view, right lateral view. Scale A–B, 1 mm.

Eupagurus cuanensis.—Forest, 1955: 114, fig 24, pl. V fig. 6.
Pagurus cuanensis.—Forest, 1958: 95 (nom.), 1966: 154.—Ingle, 1993: 129, figs. 101–104 (lit.).

Material examined. MU88, 94–120 m, (1); MU120, 109–105 m, (1); MU131, 102–104 m, (1); MU133, 87 m, (1); MU144, 119–138 m, (1); MU156, 107–102 m, (1); MU166, 87–85 m, (1); MU171, 105–100 m, (2); MU174, 85–84 m, (2); MU186, 174 m, (2); MU201, 87 m, (1); MU205, 89–93 m, (1); MU210, 86–90 m, (1); MU228, 136–172 m, (1); MU266, 103 m, (1); MU283, 92–91 m, (2); MUBV20, 155 m, (11); MUBV21, 107–109 m, (11).

Males: 2.06–6.82 mm, females: 2.27–6.00 mm, ovigerous females: 2.95–4.50 mm

Habitat. The species is mainly reported on coastal detritic bottoms (d'Udekem d'Acoz 1999; García Raso & Manjón-Cabeza 2002; García-Muñoz *et al*. 2008; El Lakhrach *et al*. 2012), but also in *Posidonia oceanica* meadows (Sánchez-Jerez *et al*. 2000; Pipitone & Arculeo 2003; Ates *et al*. 2004), *Cystoseira* beds (Koçak *et al*. 2010), sand (Pipitone & Arculeo 2003; Mutlu & Ergev 2008), coralligenous substrates (Ates *et al*. 2006) and rocky bottoms (Pipitone & Arculeo 2003; Pipitone & Vaccaro 2011).

Forest (1955) reported this species inhabiting shells of the gastropod *Xenophora senegalensis* P. Fischer, 1873 in African waters. A complete account of the symbionts associated with the inhabited gastropod shells can be found in Williams & McDermott (2004).

Our specimens were mostly found in sandy bottoms (one sample in sandy mud bottom), mainly inhabiting gastropod shells of *Xenophora crispa* (König, 1825), *Mesalia opalina* (Adams & Reeve, 1850), *Turritella wareni* Ryall & Vos, 2010 and *Turritella torulosa* Kiener, 184. We also found our specimens in shells of *Nassarius arcadioi* Rolán & Hernández, 2005, *Babelomurex tectumsinensis* (Deshayes, 1856) and an unidentified species of Marginellidae. Some shells carried worm tubes (Serpulidae, Sabellidae), anomiids and Demospongia.

Distribution. Widely distributed in the eastern Atlantic from Norway (Bergen) to South Africa (St Sebastian Bay, Eastern Cape), including the Azores and the Canary Islands, as well as the Mediterranean Sea (Barnard 1950; Ingle 1993; d'Udekem d'Acoz 1999). *Pagurus cuanensis* has been reported from the intertidal zone down to 250 m depth (d'Udekem d'Acoz, 1999).

Further records, all within this distribution, can be found in Sánchez-Jerez *et al*. (2000), Koçak *et al*. (2001), Abelló *et al*. (2002), García Raso & Manjón-Cabeza (2002), d'Udekem d'Acoz & Wirtz (2002), Pipitone & Arculeo (2003), Ungaro *et al*. (2005), Ates *et al*. (2006), García-Muñoz *et al*. (2008); Mutlu & Ergev (2008), Koçak *et al*. (2010), Thatje *et al*. (2010), Pipitone & Vaccaro (2011) and El Lakhrach *et al*. (2012).

Remarks. Our specimens coincide with those described and figured by Ingle (1993).

***Pagurus prideaux* Leach, 1815**

(Fig. 17)

Pagurus Prideaux Leach, 1815: text to and pl. 26 figs. 5, 6.
Pagurus prideauxi.—Forest, 1966: 158.
Pagurus prideaux.—Ingle, 1993: 148, figs. 121–124 (lit.).

Material examined. MU86, 91–103 m, (1); MU88, 94–120 m, (1); MU201, 87 m, (2); MU205, 89–93 m, (2).

Males: 6.17–6.86 mm, ovigerous females: 5.87–7.86 mm

Habitat. Bottoms of *Zostera marina* Linnaeus, 1753, maerl and littoral detritic bottoms to bathyal muds (d'Udekem d'Acoz 1999). Also reported in *Posidonia oceanica* meadows (Pipitone & Arculeo 2003; Ates *et al*. 2004) and rocky bottoms (Pipitone & Arculeo 2003; Pipitone & Vaccaro 2011).

Pagurus prideaux was mainly found inhabiting shells of *Fusinus rostratus* (Olivi, 1792), *Naticarius hebraeus* (Martyn, 1786) and *Naticarius stercusmuscarum* (Gmelin, 1791) but was also found in *Buccinum humphreysianum* Bennett, 1824 and *Galeodea echinophora* (Linnaeus, 1758) in the Mediterranean Sea (Caruso *et al*. 2004).

The symbionts on shells were summarized by Williams & McDermott (2004).

We found our specimens on sandy bottoms, inhabiting shells of the gastropod species *Calliostoma granulatum* (Born, 1778), *Natica canariensis* Odhner, 1932 and an unidentified species of the genus *Natica*, associated with hydrozoan species *Clytia paulensis* (Vanhöffen, 1910) and *Hydractinia multitentaculata* (Millard, 1975), as well as with the cirriped *Amphibalanus amphitrite* (Darwin, 1854). All specimens were in symbiosis with the actinian *Adamsia palliata* (O. F. Müller, 1776).

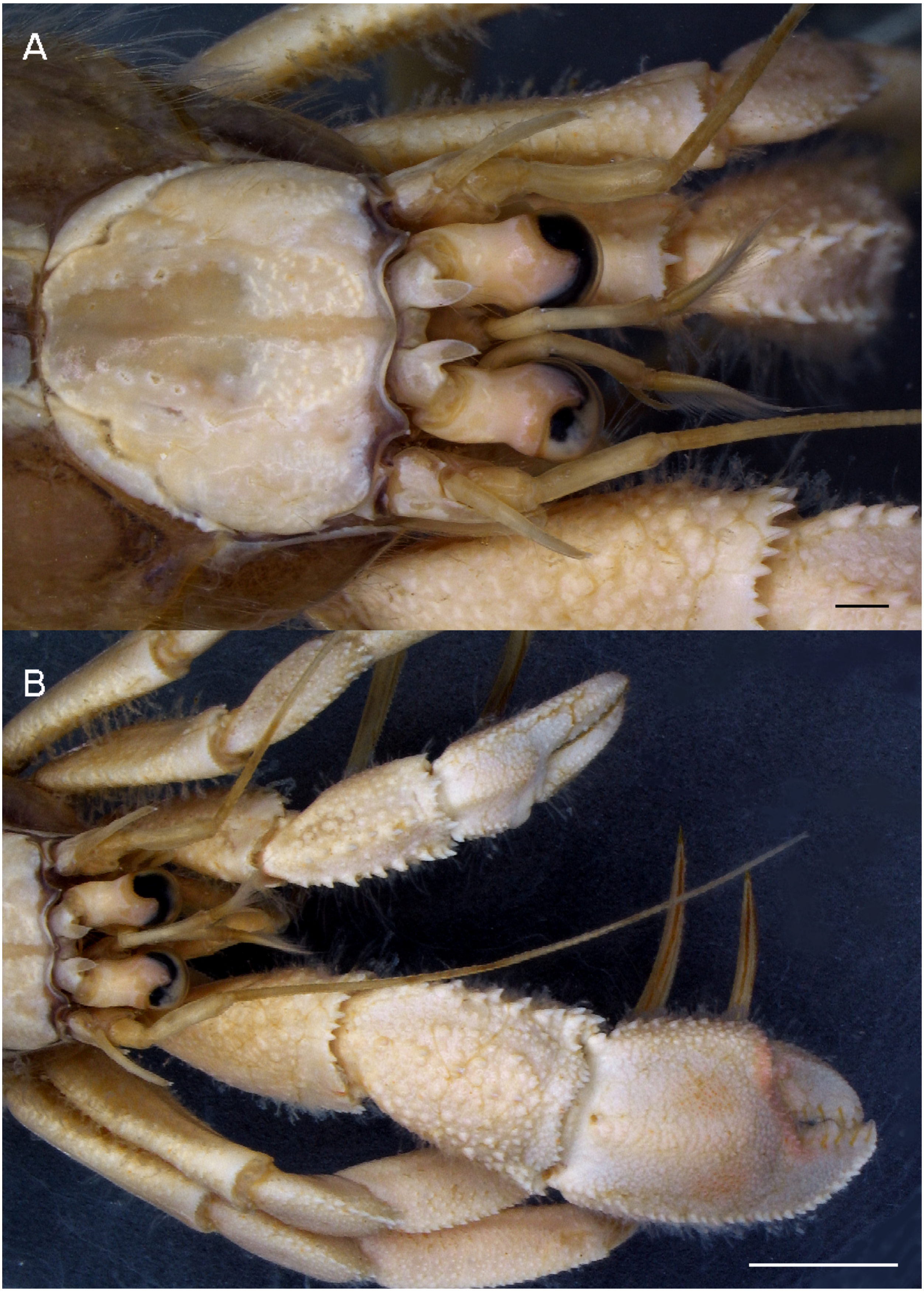

FIGURE 17. *Pagurus prideaux* Leach, 1815. Adult male, sl: 6.17 mm (MU205; UVIGOBA3 03228): A, shield and cephalic appendages. B, chelipeds: left, ventrolateral view, right lateral view. Scale: A, 1 mm; B, 5 mm.

Distribution. Widely distributed in the eastern Atlantic from the southwestern Norwegian coast to Guinea, including Madeira, the Canary and Cape Verde Islands and the Mediterranean Sea (Caruso *et al*. 2004). The record from the Red Sea was considered dubious by d'Udekem d'Acoz (1999). Bathymetric distribution from the intertidal zone (d'Udekem d'Acoz 1999) down to 678 m depth (Caruso *et al*. 2004).

Other records of this species (Ates *et al*. 2004; Ungaro *et al*. 2005; Ates *et al*. 2006; Serrano *et al*. 2006; Fanelli *et al*. 2007; Cartes *et al*. 2007; García-Muñoz *et al*. 2008; Sánchez *et al*. 2008; Koçak *et al*. 2010; Serrano *et al*. 2011; Pipitone & Vaccaro 2011; El Lakhrach *et al*. 2010; Ellis *et al*. 2013) fit well with the above-mentioned distribution.

Remarks. Our specimens coincide with those described and figured by Ingle (1993).

Pagurus pubescentulus (A. Milne-Edwards & Bouvier, 1892)
(Fig. 18)

Eupagurus pubescentulus A. Milne-Edwards & Bouvier, 1892: 219.

Eupagurus pubescentulus.—A. Milne-Edwards & Bouvier, 1900: 248, pl. 26 figs 26–30, pl. 28 figs. 13–14.—Forest, 1955: 120, fig. 26, pl. 4 figs. 5–8.

Pagurus pubescentulus.—A. Milne-Edwards & Bouvier, 1894: 72 (in part: the female at stn. 226 transferred to *Anapagurus laevis* by García-Gómez 1994: 21).—Forest, 1963: 628 (Ivory Coast and Ghana, 300–400 m).—Ingle, 1993: 145, figs. 117–120 (lit.).

Material examined. MUBV10, 332–344, (12); MUBV19, 306 m, (2).

Males: 3.55–6.49 mm, female: 4.43 mm ovigerous females: 4.71–5.00 mm

Habitat. Previously reported in bottoms of mud, sand, shells and corals (A. Milne-Edwards & Bouvier 1900; Forest 1963) and on muddy sand, sandy mud and fine sand (d'Udekem d'Acoz 1999).

The species was reported inhabiting gastropod shells of *Trochus* (A. Milne-Edwards & Bouvier 1900), *Aporrhais* ? *senegalensis* Gray and *Nassa* sp. (Forest 1955). All our specimens were without a shell.

Distribution. Scattered localities in the eastern Atlantic: Bay of Biscay, Cape Bojador (Morocco), Mauritania, Ivory Coast, Ghana, Gabon, Angola, Azores (d'Udekem d'Acoz 1999) and the Mediterranean Sea (Froglia 2010). Serrano *et al*. (2006) reported this species from the Cantabrian shelf. Bathymetric distribution is from 130 m (d'Udekem d'Acoz 1999) down to 380–400 m depth (Forest 1963: 628). Our material was collected at 306 m and 332–344 m depth.

Remarks. Our specimens concur with those described by Ingle (1993).

Genus *Paragiopagurus* Lemaitre, 1996

Paragiopagurus macrocerus (Forest, 1955)
(Fig. 19)

Parapagurus macrocerus Forest, 1955: 101, fig. 22, pl. 3 figs. 1–7.

Parapagurus macrocerus.—de Saint Laurent, 1972: 116 (cit.).—Macpherson, 1983: 12 (Namibia, 240 m)

Sympagurus macrocerus.—Lemaitre, 1990: 227 (key); 233, figs. 9, 10.

Paragiopagurus macrocerus.—Lemaitre, 1996: 207 (new comb.)

Material examined. MU143, 322 m, (1); MU206, 362–364 m, (1); MUBV10, 332–344 m, (17).

Males: 4.91–7.58 mm, females: 4.18–5.20 mm, ovigerous females: 4.41–6.06 mm

Habitat. Forest (1955) reported this species in shells of the gastropods *Clavatula* sp., *Fusus* sp., *Nassa* sp., *Natica* sp. and *Sveltia lyrata* (Brocchi, 1814). It was also reported inhabiting gastropods shells carrying an unidentified actinian (Lemaitre 1990).

Our specimens were found on sandy bottoms and in shells of the gastropod species *Nassarius wolffi* (Knudsen, 1956), associated with three different species of actinians.

Distribution. Eastern Atlantic from Mauritania (present work) to Namibian coasts (Macpherson 1983), between 145 m (Forest 1955) and 362–364 m depth (present work).

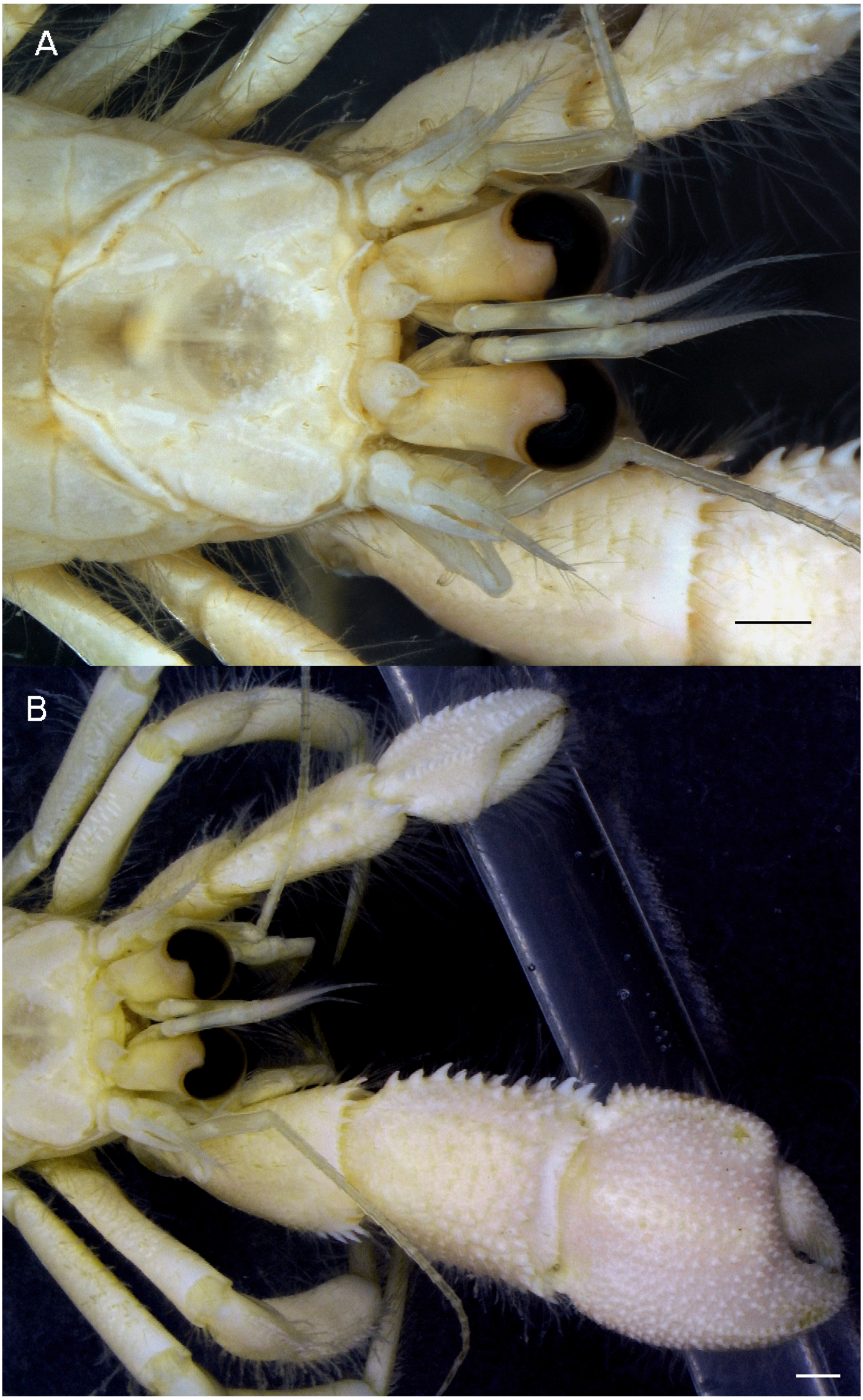

FIGURE 18. *Pagurus pubescentulus* (A. Milne-Edwards & Bouvier, 1892). Male, sl: 4.60 mm (MUBV19; UVIGOBA3 12147): A, shield and cephalic appendages. B, chelipeds: left, dorsal view, right lateral view. Scale A–B, 1 mm.

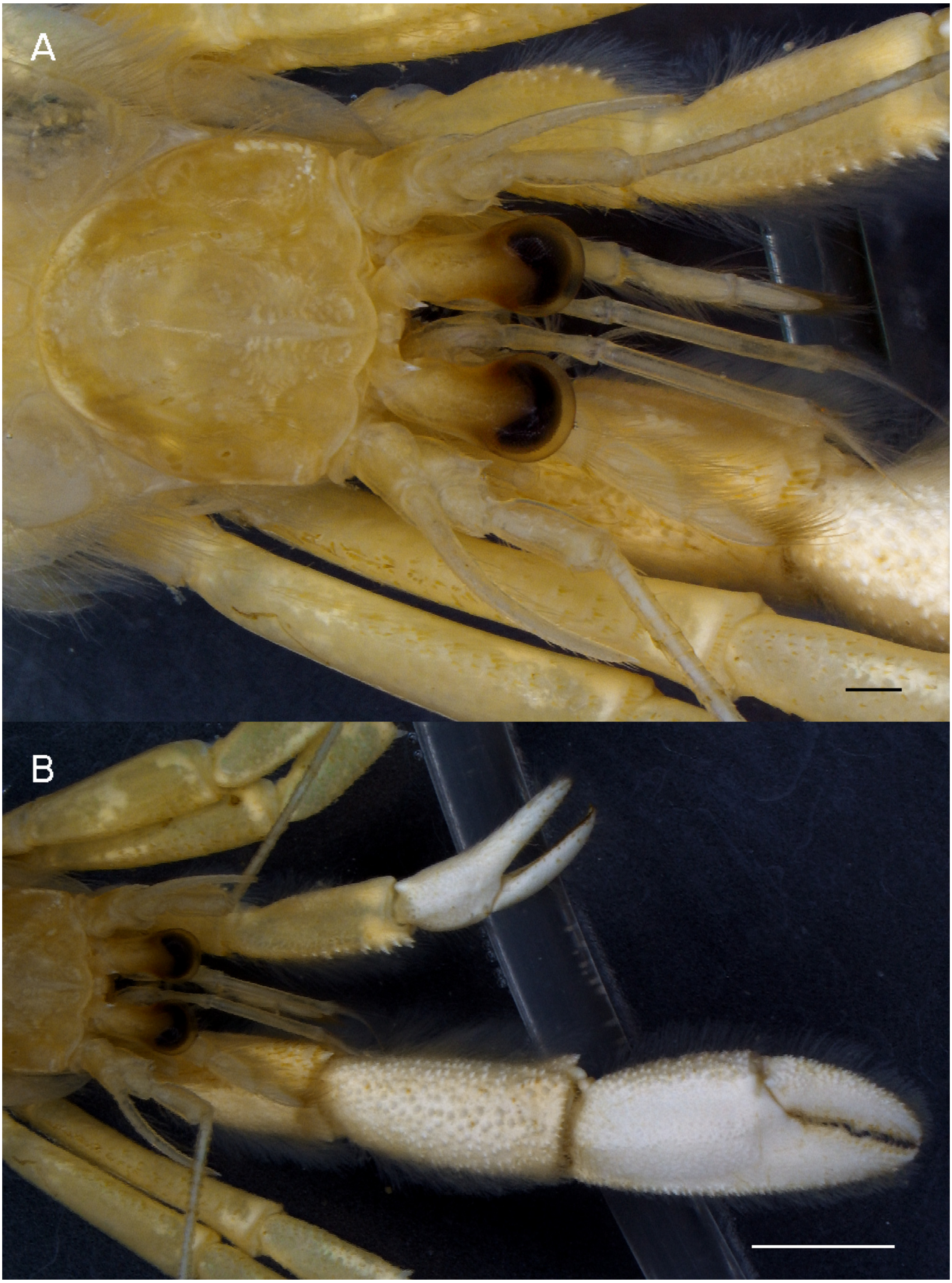

FIGURE 19. *Paragiopagurus macrocerus* (Forest, 1955). Male, sl: 6.71 mm (MUBV10; UVIGOBA3 11839): A, shield and cephalic appendages. B, chelipeds: left, dorsal view, right lateral view. Scale A–B, 1 mm.

Remarks. Our specimens concur with the original description and figures and also with those provided by Lemaitre (1990). The variability in the shape of the right cheliped was noticed by Forest (1955), who described it as being relatively short in females (with sl over 5 mm). Lemaitre (1990) indicated that the proportions of the carpus and chela of the right cheliped varied with size and sex, usually being broader in females. In our material we found the same variations described for the females in the smaller males.

This species was reported from Namibia, Angola, Congo and Ivory Coast in waters from 145 to 240–270 m (Forest 1955; Macpherson 1983; Lemaitre 1990). Our findings extend the geographical distribution of the species northwards and the bathymetrical range down to 362–364 m depth.

Genus *Parapagurus* Smith, 1879

Parapagurus nudus (A. Milne-Edwards, 1891)

(Fig. 20)

Sympagurus nudus A. Milne-Edwards, 1891: 131.

Parapagurus nudus.—Lemaitre, 1986: 533, figs. 1A, B, 2A–E, 4A, B, 5A, B, 6G, H, 7B, F, 8A–C, 9A, B.—Lemaitre, 1989: 24, figs. 5B, C, 10, 11, 12 (lit.).—Cardoso & Lemaitre, 2012: 594, figs. 3C, D.

Parapagurus pilosimanus.—García Raso, 1996: 739 (In part).

Material examined. MU75, 1688–1659 m, (1); MU116, 1685–1680 m, (1).

Male: 6.24 mm, female: 7.18 mm

Habitat. The species was reported on muddy sand bottoms (A. Milne-Edwards 1891).

Lemaitre (1989) reported this species usually without symbionts, but Williams & McDermott (2004) reported that it was not uncommon to find the species associated with actinians or zoanthids.

Our specimens were found on muddy and muddy sand bottoms, in shells of *Tonna galea* (Linnaeus, 1758) and another unidentified gastropod shell deeply damaged during the extraction of the hermit crab, with one unidentified actinian attached to the shell.

Distribution. Eastern Atlantic: the Azores, Canary and Cape Verde Islands and Gulf of Guinea; western Atlantic from off Nantucket Island (Massachusetts, USA) to Guyana (S America) (Lemaitre 1986, 1989); the species was also reported on the Mid-Atlantic Ridge (about 4°00'S) (Cardoso & Lemaitre 2012). Depth range is between 630 and 3864 m (Lemaitre 1990).

Our specimens come from around 1680 m, at similar depths to those from the Azores (A. Milne-Edwards 1891) and the Ibero-Moroccan Gulf (Türkay 1976).

Remarks. Our specimens match the descriptions and figures given by Lemaitre (1986, 1989) and Cardoso & Lemaitre (2012). The *Parapagurus nudus* males resemble *Parapagurus alaminos* Lemaitre, 1986, but can be easily distinguished by the absence of numerous small sharp tubercles on the dorsal surface of the left cheliped carpus. The variations on the carpus and the chela of the right cheliped and the exopod of the left uropod observed in our material, for both males and females, concur with those described by Lemaitre (1986). The telson armature is similar to that figured by Cardoso & Lemaitre (2012: fig. 3D)

Parapagurus pilosimanus Smith, 1879

(Fig. 21)

Parapagurus pilosimanus Smith, 1879: 51.

Parapagurus pilosimanus.—Lemaitre, 1986: 529, figs. 1C, D, 3A–E, 4C, D, 5E, F, 6I, J, 7C, G, 8H, 9F–H.—Lemaitre, 1990: 13, figs. 3, 4, 5A, 6, 39A, B (lit.).—Jones & Brewer, 2012: 105 (Mauritania, 1400–1500 m).—Cardoso & Lemaitre, 2012: 597, fig. 4 (South Atlantic, 997 m).

Parapagurus pilosimanus: García Raso, 1996: 739 (In part).

Material examined. MU08, 1308 m, (4); MU09, 1412 m, (2).

Males: 6.34–12.65 mm, females: 7.44–9.10 mm

Habitat. Reported on mud, mud with stones, muddy sand, sand, broken shells, corals and pumice bottoms, inhabiting gastropod shells of genera *Fussus*, *Natica* and *Trophon* and also a scaphopod shell of *Dentalium* (see A. Milne-Edwards & Bouvier 1900). A. Milne-Edwards & Bouvier (1900) reported the association with *Epizoanthus* and actinians, and Urzelai *et al*. (1990) with *Epizoanthus paguriphilus* Verrill, 1883. Williams & McDermott (2004) reported the platyhelminthe *Ectocotyla hirudo* (Levinsen, 1879) living in the shell and the bryozoan *Arachnoidella dhondti* (Franzén & Sandberg, 2001) over the pereiopods of the hermit crab.

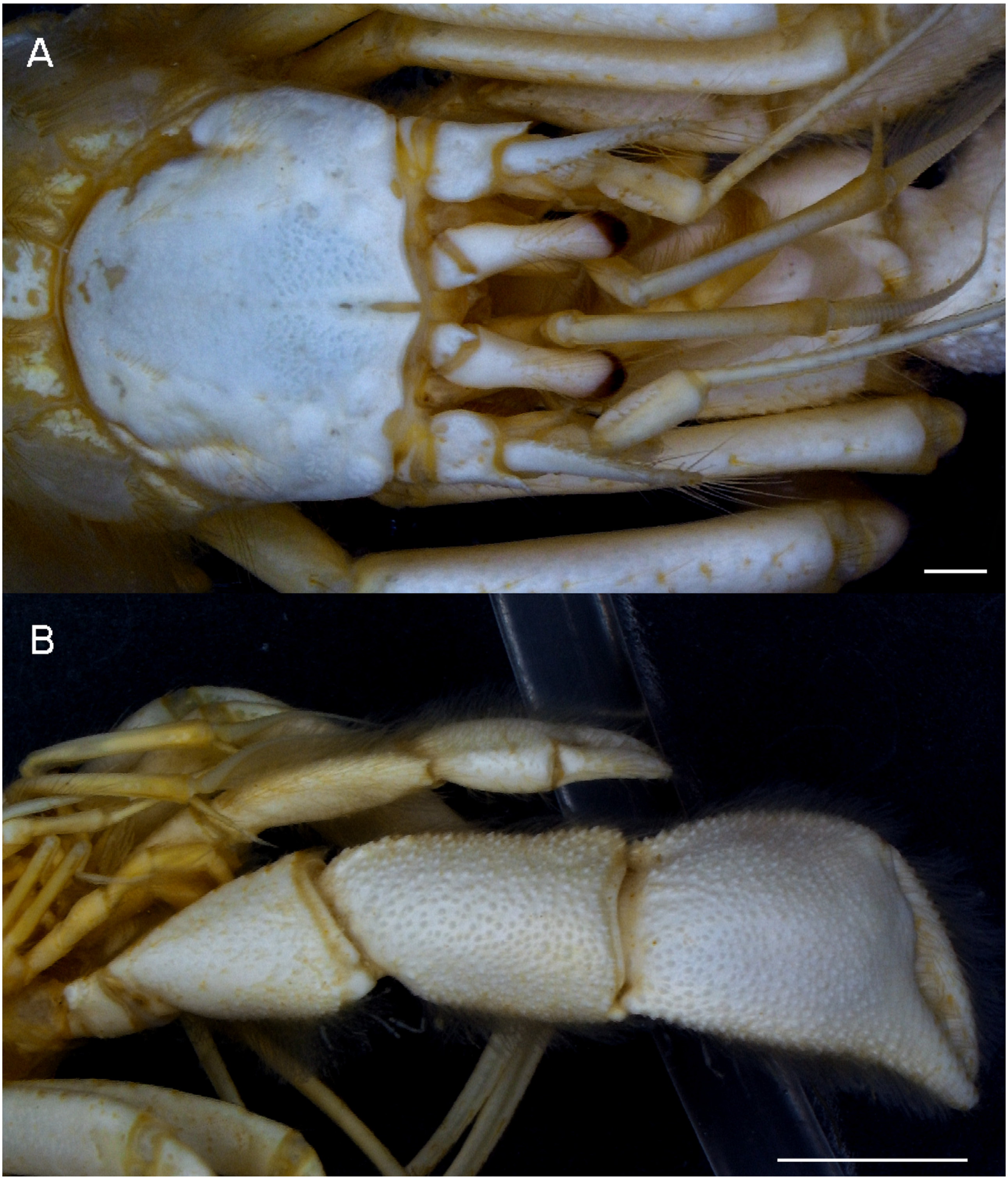

FIGURE 20. *Parapagurus nudus* (A. Milne-Edwards, 1891). Male, sl: 6.24 mm (MU116; UVIGOBA3 03877): A, shield and cephalic appendages. B, chelipeds: left, dorsomesial view, right lateral view. Scale: A, 1 mm; B, 5 mm.

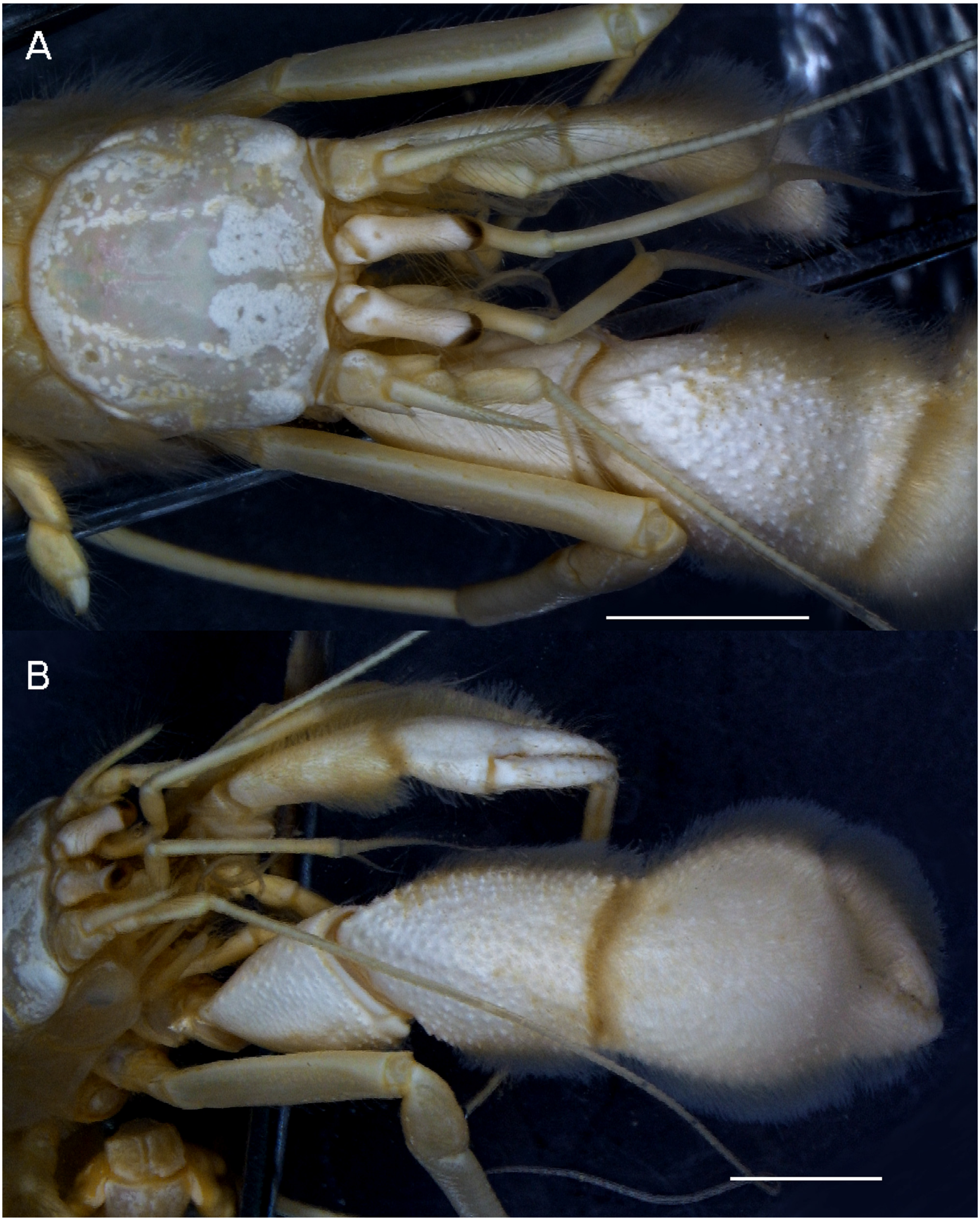

FIGURE 21. *Parapagurus pilosimanus* Smith, 1879. Female, sl: 7.44 mm (MU08; UVIGOBA3 04514): A, shield and cephalic appendages. B, chelipeds: left, dorsomesial view, right, lateral view. Scale: A–B, 5 mm.

Our material was captured on sandy mud, muddy sand and sandy bottoms, always in carcinoecia of *Epizoanthus paguriphilus*.

Distribution. Eastern Atlantic, from southwest of Iceland and Faeroe Islands to the Gulf of Guinea, and in

Tristan da Cunha Island; western Atlantic, from off Nova Scotia (Canada) to Guyana (Lemaitre 1989, 1990). The species was also reported from Walvis Ridge (Cardoso & Lemaitre 2012).

The recorded depth range is between 102 and 3864 m, but the species is mainly reported from 400 to 1400 m (Lemaitre 1989). Our specimens were mostly captured between 1100 and 1600 m. In the same area, recent remote operated vehicle (ROV) observations located *P. pilosimanus* and its symbiont zoanthid *Epizoanthus paguriphilus* at 1400–1500 m depth (Jones & Brewer 2012).

Remarks. Our specimens concur with the descriptions and figures given by Lemaitre (1986, 1989) and can be distinguished from other allied species in the area by its unarmed mesial and lateral faces of meri, carpi and propodi of the ambulatory pereiopods; the symmetrical posterior lobes of the telson; and the presence of 2 or 3 irregular rows of conical scales on the propodal rasp of the fourth pereiopods.

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BRAQUIUROS

Matos-Pita, S. S. de y Ramil, F. (2015) New species of *Neopilumnoplax* Serène in Guinot, 1969 (Decapoda, Brachyura, Mathildellidae) from Northwest Africa with a key to the genus. *Marine Biodiversity*. DOI: 10.1007/s12526-015-0361-5

Matos-Pita, S. S. de, Castillo, S. y Ramil, F. (enviado) Contribution to the knowledge of the deep brachyuran fauna (Crustacea: Decapoda) in waters off Mauritania (NW Africa). *Journal of Marine Biological Association of the United Kingdom* (en evaluación)

En el primero de estos trabajos se describe la nueva especie *Neopilumnoplax corallicola* S. de Matos-Pita & Ramil, 2015, capturada en la zona de cañones del Banco de Arguin. Además se incluyen la diagnosis de la familia Mathildellidae y claves para la identificación de los géneros y de las especies de género *Neopilumnoplax*.

En el segundo manuscrito se incluyen los resultados obtenidos del estudio de los braquiuros capturados con el arte comercial y el bou de vara sobre fondos blandos a lo largo del talud de Mauritania. Se han identificado un total de 33 especies, para cada una de las cuales se incluyen las referencias bibliográficas que consideramos básicas para su identificación, material examinado, biometrías, períodos de reproducción, tipo de sustrato sobre el que se encuentra, y revisión de su distribución geográfica y batimétrica. En algunos casos se aportan precisiones morfológicas que pueden contribuir a su identificación junto con la correspondiente discusión. Finalmente se incluye un análisis comparativo de la fauna de braquiuros de Mauritania y de otras regiones del oeste africano, discutiéndose los patrones de distribución geográfica y batimétrica.

Además cabe destacar que *Monodaeus cristulatus* Guinot & Macpherson, 1988 se cita por primera vez desde su descripción original, y que junto con otras siete especies [*Ethusa rugulosa* A. Milne-Edwards & Bouvier, 1897, *Pseudomyra mbizi* Capart, 1951, *Inachus grallator* Manning & Holthuis, 1981, *Macropodia gilsoni* (Capart, 1951), *Macropodia hesperiae* Manning & Holthuis, 1981, *Solenolambrus noordendei* (Capart, 1951) y *Spinolambrus notialis* (Manning & Holthuis, 1981)] se señalan por primera vez en aguas mauritanas, ampliando así su límite de distribución septentrional. *Goneplax barnardi* (Capart, 1951) también se cita por primera vez en las costas de Mauritania. Además, se amplía el rango de distribución batimétrica para las especies: *Acanthocarpus brevispinis* Monod, 1946, *Ethusa rugulosa*, *Inachus aguiarii* Brito Capello, 1876, *Inachus grallator*, *Inachus nanus* Manning & Holthuis, 1981, *Macropodia macrocheles* (A. Milne-Edwards & Bouvier, 1898), *Monodaeus cristulatus* Guinot & Macpherson, 1988, *Solenolambrus noordendei*, *Spinolambrus notialis* y *Liocarcinus corrugatus* (Pennant, 1777).

Resultados adicionales

El estudio de material adicional recolectado sobre fondos duros con draga de roca nos permitió identificar otras siete especies [*Bathynectes piperitus* Manning & Holthuis, 1981, *M. cristulatus*, *Cymonomus granulatus* (Norman, in Thomson, 1873), *Homola barbata* (Fabricius, 1793), *Euchirograpsus liguricus* H. Milne-Edwards, 1853, *G. barnardi* y *Goneplax rhomboides* (Linnaeus, 1758)] ya mencionadas en Matos-Pita et al. (enviado). En el caso de *Monodaeus cristulatus* se amplía su límite de distribución batimétrica hasta los 488 m de profundidad.

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SENCKENBERG

ORIGINAL PAPER

New species of *Neopilumnoplax* Serène in Guinot, 1969 (Decapoda, Brachyura, Mathildellidae) from Northwest Africa with a key to the genus

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Abstract *Neopilumnoplax corallicola* n. sp. is described from waters off Mauritania on the basis of two specimens collected during the Spanish-Mauritanian survey "Maurit-0911" from 488 m over a giant cold-water coral reef running from Cape Timiris to the Senegalese border. The new species is readily separated from its congeners by the shape of the front and anterolateral teeth, the low granulation on the dorsal carapace, and the morphology of the cheliped and ambulatory legs. This is the first record of the family from the Northeastern Atlantic and the second record of the genus in West Africa. A diagnosis of the family Mathildellidae with a key to genus level, as well as dichotomous and tabular keys to the world species of the genus *Neopilumnoplax*, are included.

Keywords Decapoda · Brachyura · *Neopilumnoplax* · New species · Identification keys · NW Africa

Introduction

The study of decapod fauna collected with a rock dredge over the giant cold-water coral reef off Mauritania during the Maurit surveys revealed the presence of an undescribed brachyuran species attributed to the Mathildellidae. This taxon was initially erected as a subfamily by Karasawa and Kato (2003) to accommodate the genera *Beuroisia* Guinot and Richer de Forges, 1981; *Branchioplax* Rathbun, 1916 (fossil); *Intesius* Guinot and Richer de Forges, 1981; *Mathildella* Guinot and Richer de Forges, 1981; *Neopilumnoplax* Serene in Guinot, 1969; *Platypilumnus* Alcock, 1894; and *Tehuacana* Stenzel, 1944 (fossil). Mathildellinae was subsequently raised to family status by Karasawa and Schweitzer (2006). To date, this family had yet to be reported in the Northeastern Atlantic.

Mathildellidae species are widely distributed in the Indian and Pacific Oceans (Guinot and Richer de Forges 1981a, b; Richer de Forges 1996; Takeda and Watabe 2004; Crosnier and Ng 2004; Ahyong 2008). However, only the genus *Neopilumnoplax* is present in the Atlantic Ocean with three species, *N. americana* (Rathbun, 1898), *N. gervaini* Tavares and Guinot, 1996, and *N. lipkeholthuisi* Tavares and Melo, 2010 reported in the Central and Southwestern Atlantic (Tavares and Guinot 1996; Tavares and de Melo 2010), and another, *N. heterochir* (Studer, 1883), in the Southeastern Atlantic, from Namibian and South African waters (Macpherson 1983; Kensley 1981). In consequence, our species is the first Mathildellidae record ever reported for the Northeastern Atlantic, and the second record for the entire Eastern Atlantic.

In addition to the study of the samples, we carried out a thorough review of the literature for all genera and species of Mathildellidae, which led us also to include here an identification key for the genera within the family and for all species within the genus *Neopilumnoplax*.

Material and methods

During the Spanish-Mauritanian survey "Maurit-0911", carried out from mid-November to mid-December 2009 on board

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R/V Vizconde de Eza, several reef-like structures were investigated along the Mauritanian coast.

During this survey, eight stations distributed between Cape Timiris and the mouth of the Senegal River were sampled with a 0.80 m-wide and 0.30-m high rock dredge, lined with a 10-mm mesh. For each haul, the working time on the bottom was 15 min. The material collected was sieved through 10-mm, 5-mm, and 1-mm mesh columns, and the brachyuran crabs were sorted to the specific level. The samples were preserved in 70 % ethanol for taxonomic study and definitive identification at the laboratory, where specimens were photographed with a motorized Nikon SMZ25 stereomicroscope and processed using NIS-Elements Microscope Imaging Software.

Abbreviations used are MUDR, Maurit surveys station code for samples taken with a rock dredge; CL, carapace length; CW, widest carapace measurement (+ indicates that it is incomplete); P2–5, pereiopods two to five.

Type specimens have been deposited at the Museo Nacional de Ciencias Naturales (MNCN), Madrid (Spain).

Taxonomy

Family Mathildellidae Karasawa and Kato, 2003

Mathildellinae Karasawa and Kato 2003: 137

Mathildellini Števčić 2005: 64

Mathildellidae Karasawa and Schweitzer, 2006: 36, 61; Castro, 2007: Table 2; Ng and Manuel-Santos 2007: 45; Castro et al., 2010: Table 1

Diagnosis: Carapace regions weakly defined; straight front with median notch; laterally broad antennular fossae. Anterior end of sternoabdominal cavity located on the posterior half of thoracic sternite 4; sutures 4/5 and 5/6 interrupted medially; sutures 6/7 and 7/8 complete; sternites 7 and 8 with median groove; absence of the posterolateral prolongation on thoracic sternite 7; lateral part of sternite 8 completely covered by the abdomen when closed, or only displaying a very small area on the edge. Dark-coloured cheliped fingers; dactyli of P2–5 with corneous tips. Males with triangular abdomen; sutures distinct in all somites; adult male abdominal somites three to five immobile. Gonopod 1 curving outwards with a very broad basal part, abruptly tapering to slender median and distal parts.

Five extant genera including 23 extant species (Ng et al. 2008; Ahyong 2008; Tavares and de Melo 2010; present work) are recognized in this family: *Intesius* Guinot and Richèr de Forges, 1981 and *Mathildella* Guinot and Richèr de Forges, 1981, known only from the Pacific Ocean; *Beuroisia* Guinot and Richèr de Forges, 1981 and *Platypilumnus* Alcock, 1894, reported from the Pacific and Indian Oceans; and *Neopilumnoplax* Serène in Guinot, 1969 distributed in the Pacific, Indian and Atlantic Oceans.

Remarks: Pilumnoplax incerta Cano, 1889, whose location in *Neopilumnoplax*, and even in the family Mathildellidae, was widely discussed by different authors (Ng et al. 2008; Ahyong 2008), has been recently considered a senior synonym of the euryplacid *Machaerus oxyacanthus* (Monod, 1956) by Castro and Ng (2010) and, therefore, here not included in the family Mathildellidae.

Dichotomous key to Mathilldellidae genera

1.	Anterior region of carapace widened due to alignment of anterolateral teeth with the front (see Guinot and Richer de Forges 1981a: Pl. 4)	*Beuroisia*
	Carapace anterior margin not aligned with front	2
2.	Carapace front and anterolateral margins spiny and/or serrulated	3
	Carapace front and anterolateral margins neither spinulose nor serrulated	4
3.	P2–5 smooth, at most with scarce granulation (see Crosnier and Ng 2004: Fig. 7)	*Intesius*
	P2–5 merus, propodus and carpus dorsally spinose and merus ventrally spinose (see Richer de Forges 1996: Figs. 1A, B; 2A, B)	*Platypilumnus*
4.	Two endostomial ridges at each lateral margin, the outer ridge smooth, entire or not; the inner ridge granulated, located only posteriorly (see Guinot and Richer de Forges 1981b: Figs. 1A, B, C; present work: Fig. 2C)	*Neopilumnoplax*
	One endostomial ridge at each lateral margin (see Guinot and Richer de Forges 1981b: Figs. 1D, E)	*Mathildella*

Genus *Neopilumnoplax* Serène in Guinot, 1969

Neopilumnoplax Serène in Guinot, 1969: 689 (footnote); Guinot and Richèr de Forges 1981b: 227 (syn.); Tavares and Guinot, 1996: 230.

Diagnosis: Carapace depressed, flat, hexagonal, slightly broader than long. Front straight, bimarginated; anterolateral margin oblique, toothed. Two endostomial ridges, the outer ridge entire, smooth, extending almost to the anterior border of the buccal cavity, and the inner ridge short, granulated, and placed only posteriorly. Chelipeds more or less unequal. Male pleopod 2 short. Abdominal segment 3 with conspicuous lateral expansion in male, while female segments 1–3 are of approximately same width; abdomen when folded showing only small portion of sternite 8.

Remarks: Mathildella was described by Guinot and Richer de Forges (1981b), differentiated from *Neopilumnoplax*, mainly because of anterolateral teeth one and two are separated in *Mathildella*, but fused in *Neopilumnoplax*, and by the single posteriorly placed ridges on each side of the endostome in *Mathildella*. In *Neopilumnoplax*, there are two such ridges on the posterior part, with the outer ridge extending towards the anterior border of the buccal cavity. Moreover, no part of sternite 8 is visible when the abdomen is folded in *Mathildella*, whereas a small part of sternite 8 remains visible in *Neopilumnoplax*.

Although Takeda and Watabe (2004: 181) pointed out that the characters used to separate the two genera are not always considered to be generic, they recognize the four known taxa of *Mathildella* (*M. serrata* Sakai, 1974, *M. maxima* Guinot and Richer de Forges, 1981, *M. rubra* Ng and Ho, 2003 and *M. kyushupalauensis* Takeda and Watabe, 2004) as allied species with a different genus status from *Neopilumnoplax*. A fifth species, *M. mclayi*, was later described by Ahyong (2008).

Of all the characters for separating *Mathildella* and *Neopilumnoplax* listed in the aforementioned works, we consider the presence of two endostomial ridges (vs. only one in *Mathildella*) (Tavares and Guinot 1996) to be the primary factor in including our species in the genus *Neopilumnoplax*. Furthermore, in our specimens, a small part of sternite 8 is visible when the abdomen folds, whereas this sternite is not exposed in those *Mathildella* species in which this feature is known (e.g., *M. serrata*, *M. maxima* and *M. mclayi*; Guinot and Richer de Forges 1981b, Ahyong 2008). In addition, the two first anterolateral teeth are fused in our specimens, although the degree of fusion/separation appears to be a variable character in the genus *Mathildella*, as showed by Ng and Chan (2000) for *M. serrata* (Sakai, 1974) and by Takeda and Watabe (2004) for *M. maxina* Guinot and Richer de Forges, 1981; this variability was also noticed by Ng and Ho (2003) and Ahyong (2008) when describing their new species *M. rubra* and *M. mclayi*, respectively.

Neopilumnoplax corallicola n. sp.

Type material: Maurit-0911, Stn. MUDR01, 16° 08′ 24″ N, 16° 57′ 12″ W (South Mauritania, near the Senegalese border), 488-m depth, 5 November 2009; two specimens on cold-water coral *Lophelia pertusa* (Linnaeus, 1758). **Holotype**: ovigerous female (CL=15.95 mm, CW=21.91 mm) (MNCN 20.04/10039), entire but lacking left P3 dactylus. **Paratype**: male (CL=12.52 mm, CW=+14.10 mm) (MNCN 20.04/10040); specimen damaged by crushing during the haul, lacking right anterolateral carapace, right pereiopod 1 and left pereiopod 5, sternum broken but not detached, right buccal appendages in separate container.

Diagnosis: Front not prominent with lateral margins gently converging. First and second anterolateral teeth fused, first slightly longer than second, third subtruncate with rounded tip, fourth triangular with blunt tip, and fifth weakly indicated. Carapace transverse ridges obsolete. Lateral endostomial ridge complete, reaching the anterior border of the buccal cavity. Palm of the major and minor chela and ambulatory legs smooth to the naked eye.

Etymology: This species is named '*corallicola*' in relation to the cold-water coral reef on which it was collected.

Description: Carapace subhexagonal, circa 1.3 times wider than long; dorsal surface almost flat, weakly convex on mesogastric region (Fig. 1F), unarmed to naked eye but covered with small granules, punctate under microscope; regions not distinctly demarcated; two parallel longitudinal shallow furrows on mesogastric anterior region; urogastric region delimited posteriorly by almost semicircular line of small light coloured spots interrupted in the midline, where two small punctations can be distinguished; protogastric, hepatic, and epibranchial ridges obsolete.

Front straight, about one-third maximum width of carapace, divided into two lobes by median notch (Fig. 1D), bimarginate (Fig. 1F), top margin weakly granulated, notch weak but discernible, lower margin sinuous, granulated, visible from dorsal view on both sides of broader notch (Fig. 2A); supraorbital margin low, demarcated on front by shallow sinus, dorsally lined with few low granules, with distinct submedian fissure; infraorbital margin rounded externally, with strong, blunt inner tooth not visible in dorsal view. Sub-orbital, pterygostomian and sub-branchial regions finely granular.

Anterolateral margin convex, first (external orbital tooth) and second anterolateral teeth fused together, separated by incipient emargination, distal margin gently sinuous, second tooth wider, shorter than first; third tooth subtruncate with rounded tip, as wide as second but longer and anteriorly directed; fourth tooth triangular with blunt tip, slightly anteriorly directed; fifth tooth smallest, weakly indicated. Lateral margins slightly convex, gradually converging posteriorly (Figs. 1D and 2A, B); posterior margin laterally ridged, medially smoother, furnished with short plumose setae.

Eyestalks with dorsomesial spiniform granules near cornea. Antennules folding obliquely, almost transversely; interantennular septum narrow (Fig. 1F). Antennal peduncle basal segment not enlarged, slightly mobile, lying along the inner orbital margin tooth.

Outer endostomial ridge entire, inner endostomial ridge posterior, granular, shorter (Fig. 2C), efferent branchial opening restricted to corners of endostome by endopod of maxilliped 1.

Maxilliped 3 somewhat elongate, covering completely buccal cavity; carpus articulating at inner distal margin of merus; merus quadrangular with internal lobe just behind carpus, antero-external angle prominent, not auriculiform; ischium with submedian longitudinal sulcus; exopod straight, with well-developed flagellum (Figs. 1B and 2D).

Chelipeds unequal in size, the right bigger than the left (Fig. 1E), and mostly smooth; basis-ischium short, separated

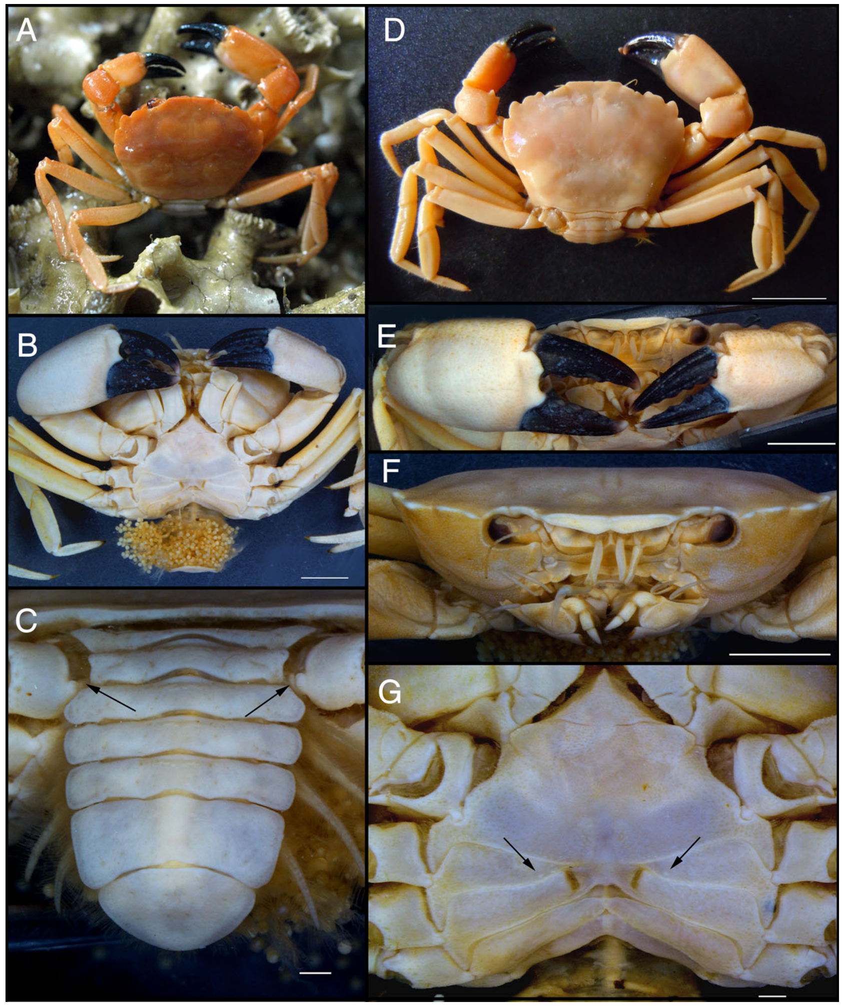

Fig. 1 *Neopilumnoplax corallicola* n. sp. Holotype, ovigerous female, CL: 14.83 mm: **A** general view, colour alive; **B** ventral view; **C** abdomen, *arrows* indicate sternite 8 condyle of articulation with P5 coxa; **D** general dorsal view; **E** chelipeds; **F** frontal view; **G** sternum, *arrows* indicate press-button of abdominal-locking mechanism. Scale bars: **A**, 10 mm, **B**, **D**, **E**, **F**, 5 mm; **C**, **G**: 1 mm

from merus by a deep suture; merus relatively short and trigonal, dorsal margin with a very low convex granular ridge, finely granular ventrally, surfaces otherwise appearing smooth but microscopically punctate; carpus upper surface granulation more developed to the inner margin, subdistal transversal granulated ridge separated from the granulated distal margin by somewhat deep transversal sinus, inner margin with two well-developed blunt teeth.

Palm of largest chela with outer and inner surfaces smooth, subdorsolateral longitudinal sulcus, dorsal margin slightly longer than fingers; fingertips crossed when closed; cutting edges with distinct teeth; outer surface of dactylus with shallow, incomplete sulcus. Palm of minor chela smooth to naked eye, with weakly low transverse granulated ridges on dorsal surface visible under magnification, rest of surface punctate, dorsal margin shorter than fingers and with subdorsolateral longitudinal sulcus; dactylus with dorsal ridge; subventral surface of fixed finger with shallow sulcus; cutting edges with distinct teeth. Cheliped fingers pigmented black throughout entire length, tips white.

Ambulatory legs as long as or slightly longer than chelipeds, relative lengths P4≈P3>P2>P5, segments sparsely setose, mainly on propodus and dactylus, surfaces smooth to naked eye, finely and evenly granular under the microscope (Fig. 1D); cross section of merus elliptical, with dorsal subdistal blunt tooth; P2–P4 dactylus elongate, styliform, slightly curved; P5 dactylus shorter, subspatuliform with dorsal margin almost straight; P2–P5 dactylus with corneus tip.

Thoracic sternum wide (Fig. 1G), with surfaces microscopically punctate; sternal suture 2/3 complete, straight; suture 3/4 laterally indicated; sutures 4/5 and 5/6 interrupted and approaching medially; sutures 6/7 and 7/8 complete; press-button of abdominal-locking mechanism with the tubercle on somite 5 close to suture 5/6 (arrows in Fig. 1G), more pronounced in male. Sternites 4, 5, and 6 with a pronounced angled posterolateral prolongation (Fig. 1G); sternite 6 with posteromedial trapezoid area weakly calcified; sternites 7 and 8 with longitudinal median groove (deeper in male); sternite 8 visible laterally when abdomen folded (smaller area in female, arrows in Fig. 1C). Anterior end of the sternoabdominal cavity

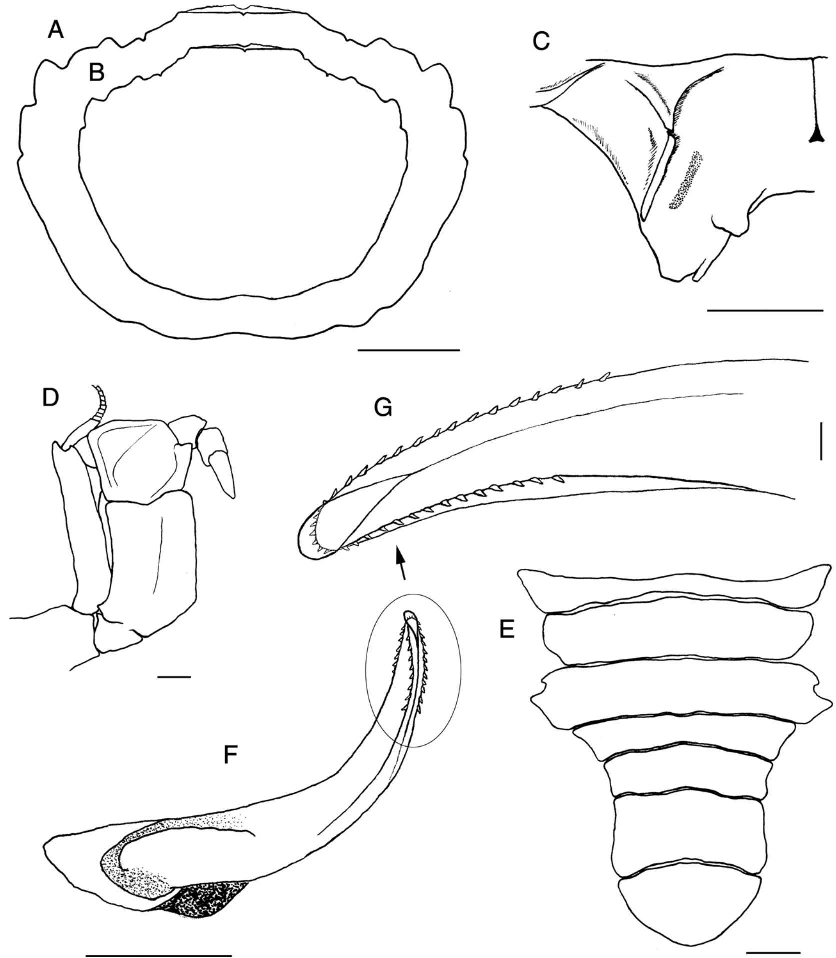

Fig. 2 *Neopilumnoplax corallicola* n. sp. Holotype female: **A** carapace outline; **C** endostome; **D** right maxilliped 3. Paratype male: **B** carapace outline with right anterolateral margin reconstructed; E, abdomen; F, right gonopod 1; G, right gonopod 1, detail. Scale bars: **A**, **B**, 5 mm; **C**, **D**, **E**, **F**, 1 mm; **G**, 0.1 mm

located on the posterior half of thoracic sternite 4. Female gonopore on sternite 6, oval-rounded, longitudinally placed from suture 5/6 but not reaching suture 6/7 (Fig. 1B). Male genital pore on P5 coxae, penis following lateral weak depression on suture 7/8.

Female abdomen broad, with 6 somites and telson freely articulated (Fig. 1C), surface microscopically punctate. Somite 1 slender, shortest medially, laterally reaching base of P5 coxae; somite 2 subrectangular, with incipient rounded lateral expansions; somite 3 widest, lateral margins with rounded projections; somites 4 and 5 similar; somite 6 longest, telson semicircular.

Male abdomen triangular, not T-shaped; with six somites and telson (Fig. 2E), surface microscopically punctate. Somite 1 slender, shortest medially, lateral margins reaching base of P5 coxae; somite 2 wider than somite 1; somite 3 widest, laterally expanded to cover gonopore and penis; somites 3–5 inmovable; somites 4–6 becoming progressively narrower, longer, somite 4 trapezoidal, somite 5 subrectangular, somite 6 subquadrangular; telson semicircular. Gonopod 1 inflated basally, tapering distally, medially curving sinuously outwards to open tip, lateral surfaces of distal third lined with small spinules, and mesial margin with small spinules on the distal fifth (Fig. 2F, G). Gonopod 2 slender, about three-quarters length of gonopod 1, apex tapering to sharp point, distal article about two-thirds as long as proximal; junction with spine-like mesial prolongation.

Variations: We observed no variation in the two specimens, other than those due to sex, in the abdomen and in the location of genital pores. The granulation and the more acute inner spines on the carpus in our male specimen can be attributed to its small size. Out of curiosity, we outlined and compared the carapaces of both specimens.... they matched perfectly!!!! (Fig. 2A and B).

Habitat: Specimens were seen inside holes and crevices of living and dead coral skeleton of *Lophelia pertusa* (Linnaeus, 1758) when the dredge came up.

Remarks: Neopilumnoplax Serène in Guinot (1969) currently includes six species: *N. americana* (Rathbun, 1898) (Central and Southwestern Atlantic), *N. gervaini* Tavares and Guinot, 1996 (Caribbean Sea), *N. heterochir* (Studer, 1883) (South and Southwest Africa), *N. nieli* Ahyong, 2008 (New Zealand), *N. sinclairi* (Alcock and Anderson, 1899)

Table 1 Tabular key to world *Neopilumnoplax* species

	N. corallicola n. sp.	*N. americana*	*N. gervaini*	*N. heterochir*	*N. lipkeholthuisi*	*N. neili*	*N. sinclairi*
Front	Not prominent, lateral margins converging gently	Prominent, lateral margins converging gently	Not prominent, lateral margins converging gently	Not prominent, lateral margins converging gently	Not prominent, lateral margins converging abruptly	Prominent, lateral margins converging abruptly	Prominent, lateral margins converging abruptly
Anterolateral teeth	1st and 2nd fused, 1st slightly longer than 2nd, 3rd subtruncate with rounded tip, 4th triangular with blunt tip, 5th weakly indicated	1st and 2nd fused, 1st markedly longer than 2nd, 3rd, and 4th spiniform, 5th weakly indicated	1st and 2nd fused, about the same length 3rd, 4th, and 5th spiniform, 3rd little longer and lobulated, 5th well-developed	1st and 2nd fused, 2nd longer than 1st, 3rd subtruncate with rounded tip, 5th weakly indicated	1st and 2nd fused, 2nd longer than 1st, 3rd, and 4th spiniform, 5th weakly indicated	1st and 2nd fused, 2nd longer than 1st, 3rd, and 4th spiniform, 5th weakly indicated	1st and 2nd fused, 3rd and 4th spiniform, 5th weakly indicated
Carapace transverse ridges	Obsolete	Obsolete	Hepatic and epibranchial	Protogastric, hepatic, and epibranchial	Protogastric, hepatic, and epibranchial	Epibranchial	Obsolete
Outer endostomial ridge	Complete	Complete	Posterior	Complete	Complete	Posterior	Unknown
Chelipeds	Major and minor palm smooth to the naked eye	Granulated, coarser in the smaller	Carpus and chela smooth to the naked eye	Major palm coarsely granular, minor palm heavily granular Merus with 4 dorsal teeth	Major palm coarsely granular, minor palm heavily granular Carpus coarsely granular, granules spiniform	Major palm smooth minor palm rugose	Major palm smooth minor palm rugose
P2–5	Smooth to the naked eye	Finely granular dorsally and ventrally, becoming finely serrate distally	With flattened granulation on dorsal margin ventral margin rough on P2–3 and almost smooth on P4–5	Merus dorsally denticulate	Strongly serrate, both dorsally and ventrally, serration more pronounced on dorsal margins	Finely granular, with granulation more pronounced on dorsal margins, becoming finely serrate distally	Smooth to the naked eye
Holotype's size (CL×CW, mm)	Female, 14×21	Male, 7.7×9.7	Male, 28.5×37	Male?, 15×19	Female, 12.5×17	Male, 14.7×19.0	Female, 13×16
Type locality and depth	South Mauritanian coast, near the Senegalese border 488 m	Off Georgia (United States) 805 m	Basse-Terre west coast (Guadeloupe Islands, Caribbean Sea) 500 m	S Cape of Good Hope (South Africa) 214 m	37° 24′ S 54° 56′ W (off Rio de La Plata mouth, Argentina) 126–132 m	39° 32.47′ – 39° 32.83′ S, 178° 19.90′ – 178° 19.95′ E (off northeastern New Zealand)775–810 m	Off Travancore coast (South India) 786 m
Distribution	Northwest Africa	Central and Southwestern Atlantic	Caribbean Sea	South and Southwest Africa	Southwestern Atlantic	New Zealand	Indian Ocean
Selected literature	Present work	Rathbun 1898: 283, Pl. VII Figs. 1 and 2 Tavares and de Melo 2010: Figs. 2A, B	Tavares and Guinot 1996: 226, Figs. 1A–C, 2A–D	Studer 1883: 11, pl. 1, Figs. 3a-d (as *Pilumnus heterochir*) Guinot and Richer de Forges 1981a: pl. 3, Figs. 1a, b; 1981b: Figs. 4A, 5D, 7A Tavares and Melo 2010: Fig. 2C	Tavares and Melo 2010: 686, Figs. 1A–C	Ahyong 2008: 48, Figs. 22–24, 29D	Alcock and Anderson 1899: 11 Doflein 1904: 120

(Indian Ocean), and *N. lipkeholthuisi* Tavares and Melo, 2010 (southwestern Atlantic).

Neopilumnoplax corallicola n. sp. can be easily distinguished from *N. americana*, *N. sinclairi*, and *N. nieli* by the front. In the last three species, the front is proportionately more prominent and with the lateral margins converging abruptly; while front in *N. corallicola* is non-prominent and the lateral margins converge gently.

Anterolateral teeth and carapace ridges can be used to separate *N. corallicola* from *N. gervaini* and *N. lipkeholthuisi*. The last two species have spiniform anterolateral teeth and conspicuously indicated dorsal granular ridges on the carapace; while anterolateral teeth are not spiniform and the carapace ridges are obsolete in *N. corallicola* n. sp.

Neopilumnoplax corallicola n. sp. is readily distinguished from the similar *N. heterochir* by the rugosity of the carapace dorsal surface, minor cheliped, and ambulatory legs. In *N. heterochir* the carapace protogastric, hepatic, and epibranchial ridges are well-defined, the dorsal margin of the merus of the ambulatory legs is spinulose, and the surface of the minor cheliped carpus and palm is strongly granulated. In contrast, *N. corallicola* shows obsolete ridges on the dorsal carapace, and faintly granular surface in the dorsal margin of the merus of the ambulatory legs and in the minor cheliped carpus and palm.

Keys to world *Neopilumnoplax* species

Dichotomous (see below) and tabular key (Table 1)

1.	Third and fourth anterolateral teeth triangular with blunt tips (Figs. 1A, D, and 2A, B; Tavares and de Melo 2010: Fig. 2C)	2
	Third and fourth anterolateral teeth spiniform (see Tavares and Guinot 1996: Fig. 1A; Ahyong 2008: Fig. 22A, B)	3
2.	Carapace ridges obsolete (Fig. 1D)	*N. corallicola* n. sp.
	Protogastric, hepatic and epibranchial ridges well-defined (Tavares and de Melo 2010: Fig. 2C)	*N. heterochir*
3.	Endostomial lateral ridge falling short of anterior margin of buccal cavity (see Tavares and Guinot 1996: Fig. 2C; Ahyong 2008: Fig. 24C)	4
	Endostomial lateral ridge complete (Fig. 2C)	5
4.	Front not prominent; P2–5 dorsal and ventral margins fine and evenly granulated; fifth anterolateral tooth well-developed (see Tavares and Guinot 1996: Fig. 1A)	*N. gervaini*
	Front prominent (see Ahyong 2008: 22A, B); P2–5 granulation more pronounced on dorsal margin, becoming finely serrated distally (see Ahyong 2008: Fig. 23F); fifth anterolateral tooth weakly indicated (see Ahyong 2008: Fig. 22B)	*N. neili*
5.	Front prominent	6
	Front not prominent; P2–5 strongly serrated both dorsally and ventrally, serration more pronounced on dorsal margins (Tavares and de Melo 2010: Fig. 1A)	*N.lipkeholthuisi*
6.	Palm of the largest chela and P2–5 smooth to the naked eye (after Alcock and Anderson 1899: 12; Doflein 1904: 120)	*N. sinclairi*
	Palm of the largest chela granulated, granulation coarser on the smaller palm (after Rathbun 1898: 284); P2–5 finely granular dorsally and ventrally, becoming finely serrated distally (after Tavares and de Melo 2010: 690; see Rathbun 1898: pl. 7, Fig. 1)	*N. americana*

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Contribution to the knowledge of the deep brachyuran fauna (Crustacea: Decapoda) in waters off Mauritania (NW Africa)

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Keywords:	Brachyura, deep-sea, Mauritanian waters, distribution, new records
Abstract:	Four multidisciplinary oceanographic surveys were conducted in November and December from 2007 to 2010, along the Mauritanian coast (NW Africa). A total of 10,514 brachyuran crabs belonging to 33 species were captured in 316 hauls at depths between 79 and 1867 m. The most specious family was Inachidae represented by nine species; the remaining twenty-four species belonged to 16 other brachyuran families. Monodaeus cristulatus is reported for the first time since its original description. Seven other species, Ethusa rugulosa, Pseudomyra mbizi, Inachus grallator, Macropodia gilsoni, Macropodia hesperiae, Solenolambrus noordendei and Spinolambrus notialis extend their range of distribution northwards and, together with Goneplax barnardi, are reported here for the first time in Mauritanian waters. New data about depth ranges are reported for Acanthocarpus brevispinis, Ethusa rugulosa, Inachus aguiarii, Inachus grallator, Inachus nanus, Macropodia macrocheles, Monodaeus cristulatus, Solenolambrus noordendei, Spinolambrus notialis and Liocarcinus corrugatus. New data relating to the spawning period for most of the species are also included, as are some biogeographical and bathymetric considerations about brachyurans studied in the area.

Mauritanian deep-water brachyuran fauna

Contribution to the knowledge of the deep brachyuran fauna (Crustacea: Decapoda) in waters off Mauritania (NW Africa)

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Abstract

Four multidisciplinary oceanographic surveys were conducted in November and December from 2007 to 2010, along the Mauritanian coast (NW Africa). A total of 10,514 brachyuran crabs belonging to 33 species were captured in 316 hauls at depths between 79 and 1867 m. The most specious family was Inachidae represented by nine species; the remaining twenty-four species belonged to 16 other brachyuran families. Monodaeus cristulatus *is reported for the first time since its original description. Seven other species,* Ethusa rugulosa*,* Pseudomyra mbizi*,* Inachus grallator*,* Macropodia gilsoni*,* Macropodia hesperiae*,* Solenolambrus noordendei *and* Spinolambrus notialis *extend their range of distribution northwards and, together with* Goneplax barnardi*, are reported here for the first time in Mauritanian waters. New data about depth ranges are reported for* Acanthocarpus brevispinis*,* Ethusa rugulosa*,* Inachus aguiarii*,* Inachus grallator*,* Inachus nanus*,* Macropodia macrocheles*,* Monodaeus cristulatus*,* Solenolambrus noordendei*,* Spinolambrus notialis *and* Liocarcinus corrugatus*.*
New data relating to the spawning period for most of the species are also included, as are some biogeographical and bathymetric considerations about brachyurans studied in the area.

Keywords: Brachyura, deep-sea, Mauritanian coasts, distribution, new records

INTRODUCTION

The infraorder Brachyura is regarded as the most diverse taxon within the Crustacea, with more than 6500 species (de Grave *et al*., 2009) related to 102 families (Ahyong *et al*., 2011).

The brachyuran fauna from the northeastern Atlantic, and especially from European coasts, is currently one of the best known worldwide. The knowledge on diversity and distribution of decapod fauna in this region was summarized by d' Udekem d'Acoz (1999). Further publications, mostly focussed on the Mediterranean Sea, provided new information on bathymetry and/or biogeographical distributions of decapods (Maynou & Cartes, 2000; Modena *et al*., 2001; Abelló *et al*., 2002; Pipitone & Arculeo, 2003; Company *et al*., 2004; Politou *et al*., 2005; Ungaro *et al*., 2005; Ateş *et al*., 2006; Fanelli *et al*., 2007; Pipitone & Vaccaro, 2011; El Lakhrach, 2012; Sánchez-Jerez *et al*., 2000), or information related to new findings or the biology of a particular brachyuran species (Mura & Cau, 2002; Capezzuto *et al*., 2012; Giacobbe & Spano, 2006; Rossetti *et al*., 2006; Guerao & Abelló, 2007; Mavidis *et al*., 2008; Isajlović *et al*., 2009; Massi *et al*., 2010; Neudecker *et al*., 2011; Porporato *et al*., 2012).

However, where West Africa is concerned, the only comprehensive monographs on brachyuran crabs are those by Monod (1956) and Manning & Holthuis (1981). In addition, some local studies on crustacean or decapod fauna were also undertaken along the West African coast, the most representative being those by Barnard (1950, 1955) in South Africa; Macpherson (1983, 1991) in Namibia; Henriksen (2009) in the Gulf of Guinea; Muñoz *et al*. (2012) in Guinea-Bissau; Fransen (1991) in both the Canarian-Cape Verdean Region and the Banc d'Arguin

(Mauritania); Anadón (1981) in northern Mauritania and southwestern Sahara; González Pérez (1995) in the Canary Islands and García-Raso (1996) in Ibero-Moroccan waters. All these works include citations for brachyurans and collectively have improved the knowledge of this group. However, no other references focus particularly on Mauritania other than a succinct list of brachyurans (Monod, 1933) and some scant records (Monod, 1956; Manning & Holthuis, 1981; Anadón, 1981; Fransen, 1991).

From 2007 to 2010, the ECOAFRIK project, led by the Spanish Institute of Oceanography (IEO), in collaboration with the University of Vigo (Spain), carried out four annual multidisciplinary surveys in Mauritanian waters (MAURIT surveys). This work presents the taxonomic results for the deep brachyuran fauna and is the first contribution associated exclusively with this group in waters off Mauritania. We also provide new data about the geographical distribution, bathymetric range and spawning periods for some of the species studied.

MATERIAL AND METHODS

The MAURIT surveys were conducted annually from 2007 to 2010 onboard the Spanish R/V 'Vizconde de Eza' along the Mauritanian coast (between 16° 05′ 49″ N and 20° 48′ 13″ W, see Map 1) in November–December.
A total of 316 stations were sampled at depths between 79 and 1867 m by means of two different bottom trawl gears. A total of 291 stations were sampled with a commercial trawl (Lofoten type, coded MU), following a stratified random sampling procedure. Another 25 stations were sampled with a 3.5 m beam trawl (coded MUBV) along five transects perpendicular to the coastline in five bathymetric strata (150, 300, 500, 1000, 1500 m), distributed along the Mauritanian coast (see Map 1). Station data, including coordinates, depth, date and collected species, are summarized in Table 1.

Samples were sorted and identified onboard to the lowest taxonomic level. For each species all the specimens were counted, weighed and pictured. A representative collection of each station and of each species was preserved in 70% ethanol and stored for further studies in the laboratory.

The classification adopted in the present work follows Ayong *et al*. (2011) to the family level, and genera assignments follow de Grave *et al*. (2009). Subsections, superfamilies, families and species are usually listed in alphabetical order.

For each species we provide some relevant literature references, including those with the descriptions of the species that best fit with our specimens. We also provide the material examined (with additional material for some species), mention of the station code, the depth range and the number of specimens captured, in brackets. As a measurement of specimens, we used the post orbital carapace length (CL), measured along the dorsal midline, from the posterior orbital margin to the posterior margin of the carapace. This measurement was obtained for males, females and ovigerous females, or combinations of all three, when appropriate. We also summarize the biological features and geographical distributions (mainly those published in the last thirty years), including the new data reported with this work, along with some remarks when required. In addition, we include pictures, mostly taken onboard, of live specimens of each species described.

In the laboratory, pictures were taken with a motorized Nikon SMZ25 stereomicroscope, using NIS-Elements Microscope Imaging Software, with an Extended Depth of Focus (EDF) patch.

The specimens examined for this work are largely deposited in the collections of the University of Vigo (Spain) (Marine Zoology Laboratory) and at the IEO (Oceanographic Centres of Cádiz and Málaga, Spain).

Abbreviations used are ICMD: Biological Reference Collections samples code of the ICM-CSIC (Instituto de Ciencias del Mar-Consejo Superior de Investigaciones Científicas), Barcelona, Spain; USNM: United States Natural Museum, Smithsonian National Museum of Natural History, Washington, USA; IEO-CD: Instituto Español de Oceanografía, Centro Oceanográfico de Cádiz, Spain.

RESULTS

SYSTEMATICS

Order DECAPODA Latreille, 1803
Infraorder BRACHYURA Latreille, 1802
Section DROMIACEA de Haan, 1833
Superfamily HOMOLOIDEA de Haan, 1839
Family HOMOLIDAE de Haan, 1839
Genus *Homola* Leach, 1815
Homola barbata (Fabricius, 1793)
(Figure 1)

Cancer barbatus Fabricius, 1793: 460.
Homola barbata: Guinot & Richer de Forges, 1995: 323 figs. 1A, 7A, B, 8a, b, e, 9a, 13a (references).

MATERIAL EXAMINED

MU87, 271–305 m, (2); MU88, 94–120 m, (1); MU119, 82–80 m, (1); MU120, 109–105 m, (1); MU122, 82–80 m, (1); MU128, 218–404 m, (1); MU131, 102–104 m, (1); MU158, 80–98 m, (1); MU162, 148–149 m, (1); MU184, 213–202 m, (1); MU186, 174 m, (1); MU200, 352–334 m, (7); MU204, 155–145 m, (1); MU223, 116–117 m, (2); MU281, 100–106 m, (1); MUBV02, 318–330 m, (1); MUBV21, 107–109 m, (1).
Males: 12.78–14.51 mm, females: 12.77–23.30 mm, ovigerous females: 15.53–21.11 mm

IDENTIFICATION

Our specimens agree well with the description provided by Manning & Holthuis (1981: 25) and González-Gurriarán & Méndez (1986: 59).

BIOLOGY

A photophilic and sciaphilic species (Pipitone & Vaccaro, 2011) previously cited from bottoms of mud, mud with rocks, muddy sand, muddy shells, seagrass, rocks and sometimes in caves (d'Udekem d'Acoz, 1999; Pipitone & Arculeo, 2003; Pipitone & Vaccaro, 2011). Bathymetric range between 2 and 637 m (d'Udekem d'Acoz, 1999). Often holding algae or small pieces of sponges over the carapace with the fifth pair of pereiopods, and sometimes reported below the tentacles of the anemone *Telmatactis cricoides* (Duchassaing, 1850) (d'Udekem d'Acoz, 1999).
Ovigerous females have been recorded in February (García Raso, 1984) and from April to September (Zariquiey Álvarez, 1968; Manning & Holthuis, 1981).
Our specimens were collected on coarse sand, coarse muddy sand, sandy mud with shell debris and muddy sand bottoms, at depths between 80–98 and 334–352 m. Ovigerous females were captured in November and December.

GEOGRAPHICAL DISTRIBUTION

Eastern Atlantic, from the Bay of Biscay to Angola, including the Azores, Madeira, Cape Verde, Desertas, Canary and Gulf of Guinea Islands; the Walter Shoals (E South Africa)

(Guinot & Richer de Forges, 1995); Central and Western Mediterranean Basin (d'Udekem d'Acoz, 1999).
Later records for this species (Monteiro *et al*., 2001; Pipitone & Arculeo, 2003; Ungaro *et al*., 2005; Henriksen, 2009; Pipitone & Vaccaro, 2011; Muñoz *et al*., 2012) fit well within this geographical distribution.

REMARKS
The ovigerous females recorded for the first time in November and December indicate that this species spawn all year round except in winter.

Paromola Wood-Mason & Alcock, 1891
Paromola cuvieri (Risso, 1816)
(Figures 2 A – B)

Dorippe cuvieri Risso, 1816: 35
Paromola cuvieri: Guinot & Forbes, 1995: 362, figs. 2, 21a, b (references).

MATERIAL EXAMINED
MU14, 502–511 m, (1); MU18, 519–402 m, (4); MU23, 532–415 m, (17); MU37, 403–442 m, (2) MU121, 274–400 m, (1); MU140, 376–377 m, (1); MU150, 292–341 m, (2) MU157, 278–454 m, (1); MU175, 618–850 m, (1); MU188, 627 m, (1); MU263, 615–624 m, (2) MUBV03, 528–538 m, (1); MUBV22, 300 m, (1).
Male: 95.20 mm, female: 76.20 mm, megalopa: 7.78 mm

IDENTIFICATION
Our specimens agree well with the descriptions and figures provided by Capart (1951: 25) and Zariquiey Álvarez (1968: 301).

BIOLOGY
Deep-water species taken on bottoms with mud or sandy mud, over a cold-water coral community (Pipitone & Arculeo, 2003; Isajlović *et al*., 2009; Capezzuto *et al*., 2012). The isolated record from the Menez Gwen hydrothermal vent must be considered with caution until confirmed (Martin & Haney, 2005). This species is often reported holding a sponge over the carapace using the fifth pereiopods (Capezzuto *et al*., 2012) and is also found with cirripeds, gorgonians and sea anemones on carapace and legs (González, 1995; Guinot & Richer de Forges, 1995). Bathymetric range usually between 80 and 300 m (d'Udekem d'Acoz, 1999), although the species was once reported at 10 m (Manning & Holthuis, 1981) and up to 1165 m depth (Cartes *et al*., 2004). Ovigerous females have been recorded in March, from May to July, October and November (Zariquiey Álvarez, 1968; Manning & Holthuis, 1981).
Our specimens were collected in muddy sand and sandy mud bottoms, in depths between 274–400 m and 618–850 m. No ovigerous females were caught.

GEOGRAPHICAL DISTRIBUTION
North and East Atlantic, from southern Iceland, the Hebrides and southern Scandinavia, south to northwestern South Africa (Tripp Seamount), including the Azores, Madeira, Canary and Cape Verde Islands; Mediterranean Sea (d'Udekem d'Acoz, 1999; Martin & Haney, 2005).
Further additional records (Macpherson, 1991; Maynou & Cartes, 2000; Abelló *et al*., 2002; Biagi *et al*., 2002; Pipitone & Arculeo, 2003; Sardà *et al*., 2003; Cartes *et al*., 2004; Company *et al*., 2004; Politou *et al*., 2005; Ungaro *et al*., 2005; Fanelli *et al*., 2007; Isajlović *et al*., 2009; Capezzuto *et al*., 2012; Muñoz *et al*., 2012) fall within this geographical range.

Section CYCLODORIPPOIDA Ahyong *et al*., 2007
Superfamily CYCLODORIPPOIDEA Ortmann, 1892

Family CYMONOMIDAE Bouvier, 1897
Genus *Cymonomus* A. Milne-Edwards, 1880
Cymonomus granulatus (Norman, in Thomson, 1873)
(Figure 3)

Ethusa granulata Norman in Thomson, 1873: 176.
Cymonomus granulatus: Zariquiey Álvarez, 1968: 813 (references)

MATERIAL EXAMINED
MUBV10, 332–344 m, (35).
Males: 4.64–5.23 mm, female: 3.52 mm, ovigerous females: 3.26–3.73 mm

IDENTIFICATION
Our specimens agree with those described in Milne-Edwards & Bouvier (1900: 34) (see Remarks).

BIOLOGY
Mainly found on shell debris and muddy bottoms (Mura & Cau, 2002), between 155 m (García Raso, 1996) and 2425 m (d'Udekem d'Acoz, 1999). Ovigerous females reported from May to July (García Raso, 1996; Mura & Cau, 2002).
Our specimens were collected at 332–344 m and ovigerous females were captured in November.

GEOGRAPHICAL DISTRIBUTION
Eastern Atlantic from SW Scotland to Mauritania; West and Central Mediterranean Sea (d'Udekem d'Acoz, 1999). In the Mediterranean Sea, this species has been reported in the Alborán Sea (Abelló *et al*., 2002) and in the Sardinian Channel (Mura & Cau, 2002). In the NE Atlantic, Cartes *et al*. (2007) reported the species on Le Danois Bank (Cantabrian Sea).

REMARKS
In our specimens, the ocular peduncles of the mesial margin are more tuberculate than those described as spinulose by Milne-Edwards & Bouvier (1900: 34). The rest of the characters agree well with the referred description and, consequently, our specimens remain within this species.
This is the first time that ovigerous females are reported at the end of the year, which suggests a biannual spawning strategy for this species.

Section EUBRACHYURA de Saint Laurent, 1980
Subsection HETEROTREMATA Guinot, 1977
Superfamily CALAPPOIDEA H. Milne-Edwards, 1837
Family CALAPPIDAE H. Milne-Edwards, 1837
Genus *Acanthocarpus* Stimpson, 1871
Acanthocarpus brevispinis Monod, 1946
(Figure 4)

Acanthocarpus bispinosus Milne-Edwards, 1880 var. *brevispinis*, Monod, 1946: 7, figs. 1–4, pl. figs. 1–2.
Acanthocarpus brevispinis: Manning & Holthuis, 1981: 50 (references).

MATERIAL EXAMINED
MU51, 468–466 m, (1); MU99, 569–598 m, (1); MU121, 274–400 m, (1); MU134, 311–436 m, (1); MU143, 322 m, (4); MUBV02, 318–330 m, (1); MUBV13, 493–517 m, (3); MUBV14, 300–281 m, (9); MUBV19, 306 m, (12); MUBV22, 300 m, (7).
Males: 15.56–55.29 mm; female: 49.85 mm; ovigerous female: 55.29 mm

IDENTIFICATION

Our specimens agree well with the descriptions given by Capart (1951: 36; as *Acanthocarpus africanus*) and Manning & Holthuis (1981: 50).

BIOLOGY

Previously reported on sandy and shelly mud bottoms (Manning & Holthuis, 1981), at depths from 100 m (Manning & Holthuis, 1981) to 517 m (Muñoz *et al*., 2012). Ovigerous females have been recorded in March and October (Manning & Holthuis, 1981).
Our specimens were collected from 274–400 m to 569–598 m on sandy mud bottoms; ovigerous females were captured in December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Cape Juby (S Morocco) to Namibia (Manning & Holthuis, 1981; Macpherson, 1983, 1991). Further records for this species were reported by Henriksen (2009) from Nigeria and Gabon, and by Muñoz *et al*. (2012) from Guinea-Bissau.

REMARKS

Material from the station MU99 at 569–598 m is the deepest known record for this species; the finding of ovigerous females in December confirms a biannual spawning strategy.

Genus *Calappa* Weber, 1795
Calappa pelii Herklots, 1851
(Figure 5)

Calappa Pelii Herklots, 1851: 12.
Calappa pelii: Manning & Holthuis, 1981: 52 (references).

MATERIAL EXAMINED

MU158, 80–98 m, (1); MUBV01, 112 m, (4); MUBV15, 148–135 m, (1); MUBV21, 107–109 m, (7).
Males: 21.11–31.91 mm; females: 30.14–40.79 mm; ovigerous female: 58.87 mm

IDENTIFICATION

Our specimens agree well with the descriptions given by Capart (1951: 39, as *Calappa peli*) and Manning & Holthuis (1981: 52).

BIOLOGY

Bottoms of mud and broken shells, usually at depths between 8–20 m and 400 m. Ovigerous females reported in March, May, August, October and December (Manning & Holthuis, 1981).
Our specimens were collected in depths between 80–98 m and 135–148 m on sandy bottoms, and ovigerous females were captured in November.

GEOGRAPHICAL DISTRIBUTION

West Africa from Western Sahara to Namibia, including Principe Island, and Central Mediterranean Sea (d'Udekem d'Acoz, 1999; Macpherson, 1991). Recent records for this species are from Guinea-Bissau (Muñoz *et al*., 2012) and from the Gulf of Guinea (Henriksen, 2009).

Superfamily CANCROIDEA Latreille, 1802
Family ATELECYCLIDAE Ortmann, 1893 (see Remarks)
Genus *Atelecyclus* Leach, 1814
Atelecyclus rotundatus (Olivi, 1792)
(Figure 6)

Cancer rotundatus Olivi, 1792: 47, pl. 2 fig. 2.
Atelecyclus rotundatus: Manning & Holthuis, 1981: 68 (references); González Gurriarán & Méndez, 1986: 113, fig. 38, foto 26.

MATERIAL EXAMINED

MUBV10, 332–344 m, (1).
Female: 27.64 mm

IDENTIFICATION

Our specimen agrees well with the specifications provided by Forest (1957: 469) and the descriptions in González Gurriarán & Méndez (1986: 113).

BIOLOGY

Recorded from sandy bottoms, often with gravel and small stones as well as muddy sand, shelly sand, gravel with shell debris and mud; also recorded on rocks, coralligenous substrates and in *Posidonia* meadows (d'Udekem d'Acoz, 1999; Pipitone & Arculeo, 2003; Ateş *et al*., 2006; Guillén *et al.* 2011). Bathymetrical distribution from intertidal to 795 m, usually between 9 and 300 m (d'Udekem d'Acoz, 1999). Ovigerous females were recorded in January and December (García Raso, 1984).
Only one female was collected in the MAURIT surveys between 332–344 m.

GEOGRAPHICAL DISTRIBUTION

Eastern Atlantic from SW Faroe Islands to South Africa (beyond Cape of Good Hope, Barnard, 1950), including the Canary, Cape Verde and Ascension Islands; Mediterranean Sea (d'Udekem d'Acoz, 1999).
Later records (Abelló *et al*., 2002; Pipitone & Arculeo, 2003; Ateş *et al*., 2006; Serrano *et al*., 2006; García-Muñoz *et al*., 2008; Sánchez *et al*., 2008; Serrano *et al*., 2011; Muñoz *et al*., 2012; Ellis *et al*., 2013) fit well within this geographical distribution.

Superfamily DORIPPOIDEA MacLeay, 1838
Family DORIPPIDAE MacLeay, 1838
Genus *Medorippe* Manning & Holthuis, 1981
Medorippe lanata (Linnaeus, 1767)
(Figure 7)

Cancer lanatus Linnaeus, 1767: 1044
Medorippe lanata: Manning & Holthuis, 1981: 31, figs. 4a–h (references).

MATERIAL EXAMINED

MU210, 86–90 m, (1); MUBV01, 112 m, (2); MUBV21, 107–109 m, (19).
Males: 6.88–20.84 mm, female: 11.27 mm, ovigerous female: 23.68 mm

IDENTIFICATION

Our specimens agree well with the description and figures in Capart (1951: 30; as *Dorippe lanata*) and in Manning & Holthuis (1981: 31).

BIOLOGY

Mostly recorded on soft heterogeneous substrates (mud, sandy mud, muddy sand and sand) at depths varying from 9 to 769 m (d'Udekem d'Acoz, 1999; Lakhrach *et al*., 2012). On Mediterranean soft bottoms, this species has been associated with demersal assemblages currently exploited by trawling (Rosseti *et al*., 2006). Ovigerous females have been reported from March to November (Zariquiey Álvarez, 1968: 313 as *Dorippe lanata*; Manning & Holthuis, 1981: 32; Modena *et al*., 2001; Rosseti *et al*., 2006).

Our specimens were collected from 86–90 m to 112 m, on sand with biogenic debris bottoms. Ovigerous females were captured in November.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from Portugal to South Africa (Natal) and Mozambique, including the Canary Islands and Mediterranean Sea (Barnard, 1950, 1955; Manning & Holthuis, 1981; d'Udekem d'Acoz, 1999).

Further records (Modena *et al*., 2001; Abelló *et al*., 2002; Biagi *et al*., 2002; Pipitone & Arculeo, 2003; Ungaro *et al*., 2005; Rosseti *et al*., 2006; Fanelli *et al*., 2007; Henriksen, 2009; Lakhrach *et al*., 2012; Muñoz *et al*., 2012) fit well within its geographical distribution.

REMARKS

Manning & Holthuis (1981) erected the genera *Medorippe* and *Phyllodorippe* in order to accommodate the Atlantic species of dorippids previously included in the genus *Dorippe*. *Medorippe* can be differentiated from *Phyllodorippe* by the male gonopod morphology (short, stubby, straight, without distal appendages and lobulated at the outer margin of base *vs* long, slender, S-shaped curves, with two short distal appendages and lacking a lobe in the proximal part) and by the presence of a row of spines on the dorsal margin of pereiopods 2 and 3.

Family ETHUSIDAE Guinot, 1977

Genus *Ethusa* Roux, 1830

Ethusa rosacea A. Milne-Edwards & Bouvier, 1897

(Figure 8)

Ethusa rosacea A. Milne-Edwards & Bouvier, 1897: 298; Monod, 1956: 88 (references); Manning & Holthuis, 1981: 38 (references).

MATERIAL EXAMINED

MUBV17, 1022–1026 m, (1).

Ovigerous female: 11.16 mm

IDENTIFICATION

Our specimen agrees well with the original description and the figures provided later by Milne-Edwards & Bouvier (1900: pls. III fig. 5, X figs. 5–8) and by Capart (1951: fig. 5).

BIOLOGY

Bottoms of sand, muddy sand and sandy mud (Manning & Holthuis, 1981; d'Udekem d' Acoz, 1999), with a bathymetric range of 84 m (Henriksen, 2009) to 1113 m (d'Udekem d' Acoz, 1999). Ovigerous females have been recorded in March, April and June (Manning & Holthuis, 1981).

Only one ovigerous female was collected in December between 1022–1026 m.

GEOGRAPHICAL DISTRIBUTION

The species is recorded in the Eastern Atlantic from scattered localities between Mauritania and Angola, including the Canary and Cape Verde Islands (d'Udekem d'Acoz, 1999). Henriksen (2009) reported this species from the Gulf of Guinea.

REMARKS

The poor development of the outer frontal teeth, the sparse setation of the carapace and the transversal broadness of the walking legs dactylus ensure the identification of our specimen as *E. rosacea*.

Ovigerous females are recorded for the first time at the end of the year, suggesting a biannual spawn strategy.

Ethusa rugulosa A. Milne-Edwards & Bouvier, 1897
(Figure 9)

Ethusa rugulosa A. Milne-Edwards & Bouvier, 1897: 297; Manning & Holthuis, 1981: 39 (references)

MATERIAL EXAMINED
MUBV01, 112 m, (1); MUBV02, 318–330 m, (1); MUBV10, 332–344 m, (26); MUBV20, 155 m, (1); MUBV21, 107–109 m, (1).
Males: 8.83–16.60 mm, females: 11.64–14.93 mm, ovigerous females: 11.09–12.64 mm

IDENTIFICATION
Our specimen agrees well with the description and figures of the type provided by Milne-Edwards & Bouvier (1900: 24).

BIOLOGY
This species has been recorded from different soft bottoms, including sand and shells, muddy sand, shelly mud and also hard substrates (Manning & Holthuis, 1981: 39; Henriksen, 2009: 154). Bathymetrical range between 55–60 m and 275 m (Manning & Holthuis, 1981: 39). Ovigerous females have been recorded in July (Manning & Holthuis, 1981: 39).
Our specimens were collected from 107–109 m to 332–344 m with ovigerous females in November.

GEOGRAPHICAL DISTRIBUTION
Eastern Atlantic, recorded from scattered localities: Mauritania (present work), the Cape Verde Islands, Senegal, Sierra Leona, Liberia and Angola (Manning & Holthuis, 1981) (see Remarks). This species was also reported from the Gulf of Guinea by Henriksen (2009).

REMARKS
Our finding is the first record of this species in Mauritania and therefore extends the northern limit of the species distribution area up to Cape Blanc. Also, the bathymetric range is extended from 275 m reported in the literature to 332–344 m in this work.
The presence of ovigerous females for the first time at the end of the year suggest a biannual spawn.

Superfamily GONEPLACOIDEA MacLeay, 1838
Family GONEPLACIDAE MacLeay, 1838
Genus *Goneplax* Leach, 1814
Goneplax barnardi (Capart, 1951)
(Figure 19)

Carcinoplax barnardi Capart, 1951: 170, figs. 65 a, b.
Goneplax barnardi: Castro, 2007: 689, fig. 27b (references).

MATERIAL EXAMINED
MU44, 606–596 m, (1); MU54, 414–451 m, (2); MU57, 430–406 m, (5); MU123, 278–362 m, (1); MU152, 381–316 m, (1); MU214, 650–588 m, (1); MU216, 422 m, (5); MUBV03, 528–538 m, (6); MUBV09, 549–555 m, (1); MUBV13, 493–517 m, (14); MUBV14, 300–281 m, (7); MUBV18, 559–574 m, (11); MUBV19, 306 m, (1); MUBV25, 499–520 m, (2).
Males: 9.73–20.01 mm, females: 12.52–15.61 mm, ovigerous females: 11.18–15.51 mm

IDENTIFICATION

Our specimens agree well with the description of the type and with the detailed figures provided in Monod (1956: 351).

BIOLOGY

Previously reported from mud and sandy mud bottoms, from 200 to 590 m (d'Udekem d'Acoz, 1999: 241). Ovigerous females have been recorded in March and May (Manning & Holthuis, 1981: 160).
Our specimens were collected between 278–362 m and 588–650 m on sand and sandy mud bottoms. Ovigerous females were captured in December.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from Western Sahara to Angola, including the Cape Verde Islands (Castro, 2007) (see Remarks). Muñoz *et al*. (2012) later reported this species from Guinea-Bissau.

REMARKS

Castro (2007) removed this species from the former *Carcinoplax* to *Goneplax* because of its longer eye peduncles, dorsal margins of the ambulatory leg (P2–P5) meri armed with an acute distal tooth (although this character is also present in the Western Pacific *Carcinoplax spinosissima* Rathbun, 1914), and slender dactyli carinated on both sides. Obviously, Castro (2007: 690) meant Eastern Atlantic when he wrote 'Western Atlantic along the west coast of Africa'.
This record constitutes the first for the species in Mauritanian waters and it is the first time that ovigerous females are reported at the end of the year. The known spawn period (March, May and December) suggests that the species is a biannual spawner.

Goneplax rhomboides (Linnaeus, 1758)
(Figure 11)

Cancer rhomboides Linnaeus, 1758: 626.
Goneplax rhomboides: Castro, 2007: 687, fig. 27A (references)

MATERIAL EXAMINED

MU143, 322 m, (1); MU207, 88–117 m, (1); MU227, 183–181 m, (3); MUBV14, 300–281 m, (2).
Males: 9.98–13.06 mm, ovigerous female: 10.05 mm

IDENTIFICATION

Our specimens agree well with the descriptions and figures in Monod (1956: 354; as *Goneplax angulata*) and in Zariquiey Álvarez (1968: 414).

BIOLOGY

Burrowing species (Atkinson, 1974; Neudecker *et al*., 2011), usually found in mud, sandy mud, muddy sand and sand bottoms; also on rocks and shells (Manning & Holthuis, 1981; d'Udekem d'Acoz, 1999; Pipitone & Arculeo, 2003; Ateş *et al*., 2006; Trenkel *et al*., 2007; Mutlu & Ergev, 2008; Fanelli *et al*., 2009; Metin *et al*., 2009; Guillén *et al*., 2011; Neudecker *et al*., 2011; Lakhrach *et al*., 2012; Ellis *et al*., 2013). Bathymetrical range from intertidal zone (d'Udekem d'Acoz, 1999) to 600–999 m (Company *et al*., 2004; Cartes *et al*., 2009). Ovigerous females were reported from January to March, from May to August, and in November and December (Zariquiey Álvarez, 1968; Manning & Holthuis, 1981; García Raso, 1984, 1996).
Our specimens were collected between 88–117 m and 322 m on sandy mud and muddy sand bottoms; and the ovigerous female was captured in December.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from the North Sea, SW United Kingdom and Ireland, European coasts southwards to Western Africa, at least up to Senegal (see Remarks), including Madeira and the Canary Islands, and in the Mediterranean Sea (Castro, 2007; Guinot & Castro, 2007).
Further records for this species from European waters and in the Mediterranean Sea, not included in the above-mentioned references of Castro (2007) and Guinot & Castro (2007), are Maynou & Cartes (2000), Monteiro *et al*. (2001), Biagi *et al*. (2002), Pipitone & Arculeo (2003), Company *et al*. (2004), Ungaro *et al*. (2005); Vincent (2005), Serrano *et al*. (2006), Ates *et al*. (2006), Sartor *et al*. (2006), Fanelli *et al*. (2007), Trenkel *et al*. (2007), Mutlu & Ergev (2008), Cartes *et al*. (2009), Fanelli *et al*. (2009), Metin *et al*. (2009), Neudecker *et al*. (2011), Serrano *et al*. (2011), Lakhrach *et al*. (2012) and Ellis et al. (2013).

REMARKS

Goneplax rhomboides has long been described as a species with a wide geographical distribution in East Atlantic waters, from the North Atlantic to South Africa (Barnard, 1950; Manning & Holthuis, 1981; d'Udekem d'Acoz, 1999). However, Guinot & Castro (2007) described the new species, *Goneplax clevai*, from the South Atlantic and western limits of the Indo-West Pacific region, including in their new species some specimens reported from the Ivory Coast to South Africa and previously identified as *G. rhomboides*. Guinot & Castro (2007: 25) accept as valid the material from Senegal mentioned by Monod (1956) for *G. rhomboides*. Consequently, the southern distribution limit of *G. rhomboides* will remain unclear southwards from Senegal until all the recorded specimens from the West African coasts can be properly checked.

Superfamily LEUCOSIOIDEA Samouelle, 1819
Family LEUCOSIIDAE Samouelle, 1819
Genus *Ebalia* Leach, 1817
Ebalia nux Norman in A. Milne-Edwards, 1883
(Figure 12)

Ebalia nux A. Milne-Edwards, 1883: pl. 5; Holthuis & Manning, 1981: 61 (references)

MATERIAL EXAMINED

MU87, 271–305 m, (1); MUBV10, 332–344 m, (3).
Males: 7.02–7.20 mm

IDENTIFICATION

Our specimens agree well with those figured by Milne-Edwards & Bouvier (1900: pls. III, Figure 7, XIII: Figures 1–5), and with the descriptions provided by Zariquiey Álvarez (1968: 328), and by González Gurriarán & Méndez (1986: 71).

BIOLOGY

This species has been recorded on shell, sand, sand and rocks, sand with calcareous algae, mud and sandy mud bottoms (d'Udekem d'Acoz, 1999; Ateş *et al*., 2006); it has been also reported living on the sea pen, *Pteroeides spinosum* (Ellis, 1764), in the Mediterranean Sea (Porporato *et al*., 2012). Depths records vary between 80 and 2983 m but usually from 150 to 500 m (d'Udekem d'Acoz, 1999). Ovigerous females have been recorded in March (Manning & Holthuis, 1981) and May–June (García Raso, 1996).
Our specimens, all males, were collected between 271–305 m and 332–344 m.

GEOGRAPHICAL DISTRIBUTION

Eastern Atlantic, from the Shetland Islands and Norway to Mauritania, including the Azores, Canary and Cape Verde Islands; and Mediterranean Sea (d'Udekem d'Acoz, 1999).

Later records for this species (Abelló *et al*., 2002; Ateş *et al*., 2006; Porporato *et al*., 2012) are all from the Mediterranean, with the exception of a report by Cartes *et al*. (2007) from Le Danois Bank (Cantabrian Sea).

Genus *Pseudomyra* Capart, 1951

Pseudomyra mbizi Capart, 1951

(Figure 13)

Pseudomyra mbizi Capart, 1951: 49, fig. 14, pl. II fig. 24; Manning & Holthuis, 1981: 66 (references).

MATERIAL EXAMINED

MUBV01, 112 m, (9); MUBV15, 148–135 m, (93).
Males: 16.54–20.31 mm, female: 15.96–17.45 mm, ovigerous females: 15.45–17.63 mm

IDENTIFICATION

Our specimens agree well with the original description and figures.

BIOLOGY

The species has been collected on a variety of bottoms, such as mud, sandy mud with shells, mud with foraminifera, muddy sand, broken shells, and also on coral and rocks. Bathymetrical range between 12–15 m and 300 m, although usually recorded from 50 to 100 m (Manning & Holthuis, 1981). Ovigerous females have been recorded from March to August, October and December (Manning & Holthuis, 1981).
Our specimens were captured in depths between 112 m and 135–148 m. The ovigerous females were caught in December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania (present work) to Angola (Manning & Holthuis, 1981) (see Remarks). Henriksen (2009) reports this species from the Gulf of Guinea.

REMARKS

This is the first record of this species from Mauritanian waters, which extends the distribution range northwards to the Banc d'Arguin.

Superfamily MAJOIDEA Samouelle, 1819

Family EPIALTIDAE MacLeay, 1838

Genus *Pisa* Leach, 1814

Pisa armata (Latreille, 1803)

(Figure 14)

Maja armata Latreille, 1803: 98.
Pisa armata: Manning & Holthuis, 1981: 318 (references)

MATERIAL EXAMINED

MU120, 109–105 m, (1); MU131, 102–104 m, (2); MU136, 103–112 m, (1); MU139, 96–97 m, (2); MU147, 134–139 m, (1); MU154, 92–102 m, (2); MU211, 92–109 m, (1); MU261, 111–146 m, (1); MUBV15, 148–135 m (1).
Males: 17.74–22.14 mm, females: 21.08–22.12 mm, ovigerous females: 22.27–24.67 mm

IDENTIFICATION

Our specimens agree well with the descriptions and figures provided by Capart (1951: 90) and by González-Gurriarán & Méndez (1986: 183).

BIOLOGY

This species has been recorded from rocky bottoms with gorgonians and corals, and also from sandy mud, mud, sand and shells bottoms (Manning & Holthuis, 1981; d'Udekem d'Acoz, 1999; García Raso & Manjón-Cabeza, 2002; Pipitone & Arculeo, 2003; Ateş *et al*., 2006). Pipitone & Arculeo (2003) recorded the species on bottoms with *Posidonia* meadows, although they showed no correlation with the meadow structure (Sánchez-Jerez *et al*., 2000). Bathymetrical range extends from 3–10 m (Pipitone & Arculeo, 2003) to 162 m (d'Udekem d'Acoz, 1999). Ovigerous females were recorded from March to May, from July to August and from November to December (Zariquiey Álvarez, 1968; Manning & Holthuis, 1981; García Raso, 1984).

Our specimens, often with sponges, ascidians and bryozoans over the carapace, were captured between 96–97 m and 135–148 m on shell debris, sand and sandy mud bottoms. Ovigerous females were collected in December.

GEOGRAPHICAL DISTRIBUTION

East Atlantic from Southern North Sea and SW British Isles to Angola, including the Azores, Canary and Cape Verde Islands; and Mediterranean Basin (d'Udekem d'Acoz, 1999).

Later records for this species (Sánchez-Jerez *et al*., 2000; Abelló *et al*., 2002; García Raso & Manjón-Cabeza, 2002; Pipitone & Arculeo, 2003; Ateş *et al*., 2006) fit well within its distribution.

REMARKS

Ng *et al*. (2008) reviewed the nomenclatural and taxonomic problems within brachyurans, and rearranged the former family Pisididae as a subfamily into Epialtidae.

Family INACHIDAE MacLeay, 1838

Inachus Weber, 1795

Inachus aguiarii Brito Capello, 1876

(Figures 15 A – B)

Inachus Aguiarii Brito Capello, 1876: 265, pl. 2 figs. 1–3.

Inachus aguiarii: Manning & Holthuis, 1981: 283 (references)

MATERIAL EXAMINED

MU120, 109–105 m, (4); MU129, 95–93 m, (1); MU131, 102–104 m, (1); MU226, 109–107 m, (1); MU277, 112–110 m, (1).

Males: 9.35–11.61 mm, ovigerous females: 10.35–11.36 mm

IDENTIFICATION

Our specimens agree with those described in Zariquiey Álvarez (1948: 301 as *Inachus thoracicus* ssp *aguiarii*).

BIOLOGY

Previously recorded from hard bottoms with sponges and kelp; also from soft bottoms of sandy mud often mixed with shell fragments, sand or sand with calcareous algae. Recorded at depths from 20 to 100 m (d'Udekem d'Acoz, 1999). Ovigerous females recorded in February, March and August (Zariquiey Álvarez, 1968; García Raso, 1989).

Our specimens were collected from 93–95 m to 110–112 m on sand, coarse sand, gravel and sandy mud bottoms. Ovigerous females were captured in November and December.

GEOGRAPHICAL DISTRIBUTION

East Atlantic from Portugal to Guinea including the Desertas and Canary Islands (d'Udekem d'Acoz, 1999); in the Mediterranean Sea, the species was reported only in the Alboran and Aegean Seas (Guerao & Abelló, 2007).

REMARKS

Bathymetric range is slightly higher than that reported in the literature.
The finding of ovigerous females in November and December suggests that this species spawns all year round.

Inachus angolensis Capart, 1951
(Figure 16)

Inachus angolensis Capart, 1951: 72, fig. 72, pl. I fig. 7, pl. II fig. 10; Manning & Holthuis, 1981: 283 (references)

MATERIAL EXAMINED

MU88, 94–120 m, (1); MU130, 252–362 m, (1); MU133, 87 m, (1); MU137, 81–84 m, (3); MU161, 89–92 m, (1); MU168, 87–92 m, (1); MU174, 85–84 m, (4); MU205, 89–93 m, (1); MU210, 86–90 m, (9); MU212, 163–200 m, (1); MU251, 107 m, (1); MU260, 101–120 m, (1); MU291, 106–137 m, (1); MUBV01, 112 m, (12); MUBV02, 318–330 m, (1); MUBV14, 300–281 m, (1); MUBV15, 148–135 m, (11); MUBV21, 107–109 m, (6).
Males: 10.04–15.11 mm, females: 8.36–13.67 mm, ovigerous females: 11.56–15.35 mm

IDENTIFICATION

Our specimens agree well with the original description and also with the notes and the figures provided by Monod (1951: 524, figs. 712 and 713).

BIOLOGY

This species has been recorded from mud, sandy mud and sandy bottoms (Manning & Holthuis, 1981), at depths from 0–81 m (Henriksen, 2009) up to at least 350 m (Manning & Holthuis, 1981). Ovigerous females were recorded from February to June, September and October (Manning & Holthuis, 1981).
Our specimens were captured between 81–84 m and 252–362 m on coarse sand, sandy mud with gravel or shell fragments. Ovigerous females were collected in November and December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Western Sahara (Manning & Holthuis, 1981) to Namibia (Macpherson, 1991). Henriksen (2009) reports this species from the Gulf of Guinea.

REMARKS

The finding of ovigerous females in November and December suggests that this species spawns throughout the year.

Inachus grallator Manning & Holthuis, 1981
(Figures 17 A – B)

Inachus grallator Manning & Holthuis, 1981: 287, figs. 73, 74.

MATERIAL EXAMINED

MUBV10, 332–344 m, (1); MUBV14, 300–281 m, (1).
Males: 6.91 and 7.72 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Reported from green mud, brown sandy mud, muddy sand and green muddy sand, at depths between 100 m and 250–300 m (Manning & Holthuis, 1981) and down to 325 m (Fransen, 1991). Ovigerous females have been recorded in January and November (Manning & Holthuis, 1981).

Only two males were collected during the MAURIT surveys, at 281–300-m and 332–344-m depth.

GEOGRAPHICAL DISTRIBUTION

West Africa in Mauritania (Fransen, 1991 in part; present work) and from Nigeria to Namibia (Manning & Holthuis, 1981; Macpherson, 1991) (see Remarks).

REMARKS

Although the possibility of finding this species up to the Western Sahara (Manning & Holthuis, 1981) or the Canary Islands (González Pérez & Quiles Lucas, 2003) has been mentioned in the literature, to date no records further north than Nigeria—excepting those in Fransen (1991)—have been reported from Mauritania and the Canary Islands. The fact that Manning & Holthuis (1981) described *I. grallator* as a 'deep-water species, known to occur at depths between 100 m and 250–300 m' suggests that further revision is required for Fransen's (1991) records for this species at less than 100-m depth. Our record confirms the presence of this species in Mauritanian waters and slightly increases the previously reported bathymetrical range.

This species closely resembles another *Inachus* species, *I. dorsettensis*. However, after analyzing some specimens of *I. dorsettensis* from Galicia (NW Spain), we conclude that the slenderness of the pereiopods and the shape of the dactyli of the fifth pereiopods ensure the identification of the Mauritanian material as *I. grallator*.

Inachus leptochirus Leach, 1817

(Figures 18 A – C)

Inachus leptochirus Leach, 1817, In Leach 1815-1875: 1 p, pl. XXII.b figs. 1, 2, 3; Manning & Holthuis, 1981: 291 (references)

MATERIAL EXAMINED

MU200, 352–334 m, (4); MU204, 155–145 m, (1); MUBV10, 332–344 m, (29).
Males: 9.28–19.21 mm, female: 13.93–19.33 mm, ovigerous females: 10.56–18.37 mm

IDENTIFICATION

Our specimens agree well with notes and figures in Bouvier (1940: 356) and Zariquiey Álvarez (1968: 472).

BIOLOGY

Bottoms of gravel, sand, mud and maerl beds, at depths between 27 m (d'Udekem d'Acoz, 1999) and 500–650 m (Serrano *et al*., 2011). Ovigerous females have been observed in February, May and November (Zariquiey Álvarez, 1968).

Our specimens were captured between 145–155 m and 334–352 m on coarse sand and muddy sand bottoms, mixed with shell debris. Ovigerous females were collected in November.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from the Faroe Islands to Mauritania, including the Azores; and Mediterranean Sea (d'Udekem d'Acoz, 1999). This species was recently reported in the N Iberian Peninsula by Serrano *et al*. (2011).

Inachus nanus Manning & Holthuis, 1981
(Figure 19)

Inachus nanus Manning & Holthuis, 1981: 291, fig. 75a–e.

MATERIAL EXAMINED

MU166, 87–85 m, (2); MU207, 88–117 m, (1); MU212, 163–200 m, (1); MU261, 111–146 m, (1).
Male: 9.50 mm, ovigerous female: 6.72 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Previously reported on broken shells, bryozoans, gravel, mud with foraminifera and muddy sand bottoms. Depth records between 29 and 118 m (d'Udekem d'Acoz, 1999: 198). Ovigerous females have been collected in February, May to July, September and October (Manning & Holthuis, 1981).
Our specimens were found between 85–87 m and 163–200 m on muddy sand, coarse muddy sand and shell debris bottoms. Ovigerous females were captured in December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania to Cameroon, including the Canary Islands (d'Udekem d'Acoz, 1999).

REMARKS

This record slightly increases the bathymetrical range of this species down to 163–200 m; the presence of ovigerous females in December suggests that this species spawns throughout the year.

Genus *Macropodia* Leach, 1814
Macropodia gilsoni (Capart, 1951)
(Figures 20 A – B)

Achaeopsis gilsoni Capart 1951: 65, pl. I fig. 4, 10, pl. II fig. 3.
Macropodia gilsoni: Manning & Holthuis, 1981: 297 (references)

MATERIAL EXAMINED

MU119, 82–80 m, (2); MU120, 109–105 m, (3); MU131, 102–104 m, (1); MU138, 123–130 m, (2); MU139, 96–97 m, (1); MU149, 93–146 m, (1); MU151, 110–134 m, (1); MU156, 107–102 m, (1); MU161, 89–92 m, (2) MU166, 87–85 m, (2) MU168, 87–92 m, (2) MU170, 102–92 m, (13); MU210, 86–90 m, (4); MU217, 111–113 m, (1); MU223, 116–117 m, (2); MU233, 165–189 m, (1); MU235, 123 m, (1); MUBV15, 148–135 m, (10); MUBV21, 107–109 m, (1).
Males: 4.71–9.36 mm, females: 3.21–5.09 mm, ovigerous females: 11.05–4.35 mm

IDENTIFICATION

Our specimens agree well with the description of the type and also with the figures provided by Monod (1956: 555).

BIOLOGY

Species recorded on various kinds of muddy bottoms, including bottoms with shells and bryozoans or foliate foraminifera (Manning & Holthuis, 1981), at depths from 37 m (Holthuis &

Manning, 1981) up to 264 m (Henriksen, 2009 see Remarks). Ovigerous females recorded throughout the year, except in July (Manning & Holthuis, 1981: 297).

Our specimens were captured between 80–82 m and 165–189 m on sandy mud, sand and muddy sand bottoms usually mixed with shell debris. Some specimens carried the hydrozoan *Obelia bidentata* Clark, 1875, on the carapace and legs. Ovigerous females were collected in November and December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania (present work) to Angola (Manning & Holthuis, 1981) (see Remarks). Henriksen (2009) reported this species off Nigeria, Cameroon and Congo.

REMARKS

Our record is the first report of this species in Mauritania, extending its geographical distribution northwards from Senegal to the Banc d'Arguin.

The record for this species in Henriksen (2009) from Cameroon at stn 938, Long.: 9.150 Lat.: 3.900, at 0 m depth, must be considered as an error.

Macropodia hesperiae Manning & Holthuis, 1981
(Figure 21)

Macropodia hesperiae Manning & Holthuis, 1981: 298, fig. 77a–e.

MATERIAL EXAMINED

MU119, 82–80 m, (1); MU129, 95–93 m, (1); MU154, 92–102 m, (2).

Male: 6.48 mm, female: 6.52 mm, ovigerous female: 5.82 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Previously recorded on bottoms of mud, sand and compacted sand, at depths varying from 46–49 m to 82–97 m. Ovigerous females have been reported in May (Manning & Holthuis, 1981).

Our specimens were captured between 80–82 m and 92–102 m on compact coarse sand bottoms.

Some specimens carried the hydrozoan species *Nemertesia* sp and some colonies of the branched bryozoan species *Synnotum aegyptiacum* (Audouin, 1826) on their carapaces. The only ovigerous female was collected in December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania (present work) to Nigeria (Manning & Holthuis, 1981).

REMARKS

González Pérez (1995) mentioned one specimen from the Canary Islands identified as *Macropodia* aff. *hesperiae* and collected at 821 m. However, since all the previous records of this species, including those in this study, were found in depths between 46–49 m and 92–102 m, we don't consider as valid the record from Canary Islands until further confirmation of the species identification.

Our finding extends the distribution area of this species northwards from Senegal up to Cape Timiris.

The record of ovigerous females in December indicates that this species spawns at least biannually.

Macropodia longipes (A. Milne-Edwards and Bouvier, 1899)

(Figure 22)

Stenorhynchus longipes A. Milne-Edwards and Bouvier, 1899: 48
Macropodia longipes: Manning & Holthuis, 1981: 300 (references)

MATERIAL EXAMINED
MU277, 112–110 m, (1).
Male: 7.45 mm

IDENTIFICATION
Our specimen agrees well with descriptions provided in Forest & Zariquiey Álvarez (1964: 226) and González-Gurriarán & Méndez (1986: 169).

BIOLOGY
Species reported in the literature from bottoms of sand and broken shells (Anadon, 1981), sand, silt, gravel and coarse sands (Serrano *et al*., 2011), and in seagrasses (Ateş *et al*., 2006). Depth records from 9 m (d'Udekem d'Acoz, 1999) to 1249 m (Cartes *et al*., 2004). Ovigerous females recorded in February, March, August and September (Zariquiey Álvarez, 1968; Pipitone & Tumbiolo, 1993: 362).
The only specimen examined here was a male, collected between 110 and 112 m on a muddy sand bottom.

GEOGRAPHICAL DISTRIBUTION
East Atlantic, from the Gulf of Gascogne to Mauritania, including the Cape Verde Islands; and Mediterranean Sea (Forest, 1978 as *Macropodia tenuirostris longipes*).
Further records for this species all refer to the Mediterranean Sea (Modena *et al*., 2001; Abelló *et al*., 2002; Biagi *et al*., 2002; Cartes *et al*., 2004; Colloca *et al*., 2004; Politou *et al*., 2005; Ungaro *et al*., 2005; Ateş *et al*., 2006 and Fanelli *et al*., 2007; García-Muñoz *et al*., 2008; Serrano *et al.*, 2011).

REMARKS
Since Forest (1978) declared *Macropodia tenuirostris longipes* as the deepest form of *M. tenuirostris tenuirostris*, some authors subsequently synonymized both subspecies under the name *Macropodia tenuirostris* (d'Udekem d'Acoz, 1999; Pipitone & Arculeo, 2003). However, we follow Ng *et al*. (2008), who kept them as two different species, only including here references that refer to *M. longipes* as a separate species or subspecies.
Although the rostrum of our specimen is a little damaged, the slightly curved (not arcuated) P4, P5 dactylus, the basal article of antenna with strong spines ventrally, the presence of a nuchal spine and the absence of spines on the supraorbital margin ensure its identification as *M. longipes*.

Macropodia macrocheles (A. Milne-Edwards & Bouvier, 1898)
(Figures 23 A – C)

Stenorhynchus macrocheles A. Milne-Edwards & Bouvier, 1898: 153
Macropodia macrocheles: Manning & Holthuis, 1981: 301 (references)

MATERIAL EXAMINED
MU100, 236–238 m, (3); MU105, 343–346 m, (1); MU141, 280–277 m, (11); MU149, 93–146 m, (1); MU155, 210–257 m, (3); MU157, 278–454 m, (3); MU159, 224–229 m, (7); MU173, 314–540 m, (1); MU179, 303–304 m, (1); MU184, 213–202 m, (2); MU233, 165–189 m, (1); MU280, 230–239 m, (2); MUBV22, 300 m, (1).
Males: 4.41–9.75 mm, ovigerous females: 5.17–6.45 mm

IDENTIFICATION

Our specimens agree well with the descriptions and figures in Milne-Edwards & Bouvier (1900: 159) and Capart (1951: 77).

BIOLOGY

Collected on mud, sand and muddy sand bottoms, at depths between 96 and 300 m (Manning & Holthuis, 1981). Ovigerous females have been recorded in January, February, May, June and December (Manning & Holthuis, 1981).

Our specimens were captured in depths between 93–143 m and 314–540 m on muddy sand and sandy mud bottoms. Some specimens carried hydroid colonies of *Clytia gracilis* (Sars, 1850), *Clytia paulensis* (Vanhöffen, 1910), *Antennella secundaria* (Gmelin, 1791) and a branched unidentified bryozoan species of the genus *Bugula* Oken, 1815, on their carapaces. Ovigerous females were collected in December.

GEOGRAPHICAL DISTRIBUTION

West Africa, from Mauritania (Manning & Holthuis, 1981) to Namibia (Macpherson, 1991).

REMARKS

Our findings slightly extend the bathymetrical range previously reported in the literature.

Family MAJIDAE Samouelle, 1819

Genus *Eurynome* Leach, 1814

Eurynome aspera (Pennant, 1777)

(Figure 24)

Cancer Asper Pennant, 1777: 7, pl IX.A, fig. 20

Eurynome aspera: Griffin, 1974; Manning & Holthuis, 1981: 311 (references)

MATERIAL EXAMINED

MU183, 138–177 m, (1), MU209, 115–150 m, (1).

Males: 10.35–11.87 mm

IDENTIFICATION

Our specimens agree with the description and figures provided by Zariquiey Álvarez (1968: 462) and González-Gurriarán & Méndez (1986: 178).

BIOLOGY

Mainly reported on firm substrates of relatively large particles, bottoms of shelly sand, calcareous algae, muddy shells and gravel, maerl beds and on rock (Manning & Holthuis, 1981; Ballesteros, 2006) and in *Posidonia* meadows (Pipitone & Arculeo, 2003; Ates *et al*., 2006). Bathymetrical range between 10 and 1216 m (d'Udekem d'Acoz, 1999: 188). Ovigerous females reported in April (Zariquiey Álvarez, 1968).

Specimens examined were two males collected at 115–150-m and 138–177 m.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from Norway to Angola, including the Azores, Desertas, Canary and Cape Verde Islands; Mediterranean Sea; West Indian Ocean from False Bay, South Africa, to Durban (Griffin, 1974; d'Udekem d'Acoz, 1999).

Later records for this species (Abelló *et al*., 2002; García Raso & Manjón-Cabeza, 2002; Pipitone & Arculeo, 2003; Serrano *et al*., 2006; Ateş *et al*., 2006; García-Muñoz *et al*., 2008; Cartes *et al*., 2007 and Ellis *et al*., 2013) fit well within its geographical distribution.

Superfamily PARTHENOPOIDEA MacLeay, 1838

Family PARTHENOPIDAE MacLeay, 1838
Genus *Distolambrus* S. H. Tan & Ng, 2007
Distolambrus maltzami (Miers, 1881)
(Figure 25)

Heterocrypta Maltzami Miers, 1881: 209, pl. 13: fig 1.
Heterocrypta maltzami: Manning & Holthuis 1981: 322 (references)
Distolambrus maltzami: Tan & Ng, 2007: 103, fig. 5; Henriksen, 2009: 80, fig. 40

MATERIAL EXAMINED

MUBV21, 107–109 m, (2).
Ovigerous female: 8.08 mm

IDENTIFICATION

Our specimen agrees well with the description provided by Milne-Edwards & Bouvier (1900: 121, as *Heterocrypta Maltzani* and *Heterocrypta Maltzani* var. *Marioni*).

BIOLOGY

Previously reported from bottoms of shell debris, shelly sand, sand, muddy sand, mud, calcareous algae and rock (Manning & Holthuis, 1981, as *Heterocrypta maltzami*; d'Udekem d'Acoz, 1999, as *Heterocrypta maltzami marionis*). Bathymetrical range oscillates between 22 and 550 m (d'Udekem d'Acoz, 1999, as *Heterocrypta maltzami marionis*), but all previous West African records are from less than 100 m depth (0–70 m) (Manning & Holthuis, 1981; as *Heterocrypta maltzami*).
On the West African coast, ovigerous females have been found throughout the year (Zariquiey Álvarez, 1968; as *Heterocrypta maltzami*).
Only one ovigerous female was collected in December during the MAURIT surveys, between 107 and 109 m.

GEOGRAPHICAL DISTRIBUTION

Eastern Atlantic Ocean from the Bay of Biscay to Angola, including the Azores and Cape Verde Islands (Manning & Holthuis, 1981), as well as in the Mediterranean Sea (d'Udekem d'Acoz, 1999).
Later records (Pipitone & Arculeo, 2003; Serrano *et al*., 2006; Henriksen, 2009; Massi *et al*., 2010) fit well within its geographical distribution.

REMARKS

In their systematic revision of the subfamily Parthenopinae, Tan & Ng (2007) relocated the former *Heterocrypta maltzami* in their new genus *Distolambrus*. Both genera can be easily differentiated by the presence of a V-shaped ridge on the gastric region of *Distolambrus* (U-shaped in *Heterocrypta*); the branchial ridge not continuous with the gastric ridge (continuous in *Heterocrypta*); male with fused thoracic sternites without a transverse groove (with a broad transverse groove in *Heterocrypta*); third maxilliped merus subtriangular (subquadrate in *Heterocrypta*); and the posterior margin not produced beyond the base of the abdomen (produced in *Heterocrypta*).

Genus *Solenolambrus* Stimpson, 1871
Solenolambrus noordendei (Capart, 1951)
(Figure 26)

Heterocrypta noordendei Capart, 1951: 108, fig. 37, pl. II fig. 15.
Solenolambrus noordendei: Manning & Holthuis, 1981: 336 (references); Tan, 2004: 500, figs. 137G, H; 140B (references)

MATERIAL EXAMINED

MU86, 91–103 m, (1); MU170, 102–92 m, (13); MU171, 105–100 m, (19); MU183, 138–177 m, (1); MU210, 86–90 m, (1); MU212, 163–200 m, (2); MU233, 165–189 m, (1); MUBV01, 112 m, (63); MUBV02, 318–330 m, (2); MUBV10, 332–344 m, (6); MUBV15, 148–135 m, (11); MUBV21, 107–109 m, (18).

Males: 8.26–13.61 mm, ovigerous females: 6.71–10.81 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Species found on a variety of bottoms such as mud, muddy sand, mud with branched foraminifera, sandy mud, shelly mud, broken shells, coral or rock, at depths between 64 and 215 m. Ovigerous females have been previously recorded in February, March, May, July and November (Manning & Holthuis, 1981).

Our specimens were captured in depths from 86–90 to 332–344 m, in bottoms of coarse sand with mud and shell debris, muddy sand and sandy mud. Ovigerous females were collected in November and December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania (present work) to Angola (Manning & Holthuis, 1981).

REMARKS

Our records extend northwards the geographical distribution, from Senegal to Cape Blanc. They also broaden the bathymetrical range of the species down to 322–344 m. The presence of ovigerous females also in December suggests that this species spawns throughout the year.

Genus *Spinolambrus* S. H. Tan & Ng, 2007

Spinolambrus notialis (Manning & Holthuis, 1981)

(Figure 27)

Parthenope notialis Manning & Holthuis, 1981: 331, figs. 85, 86a–b.

Spinolambrus notialis: Tan, 2004: 524, figs. 144A–B, 146B; Tan & Low, 2014: 96, fig. 2B.

MATERIAL EXAMINED

MU131, 102–104 m, (1); MU186, 174 m, (1); MUBV21, 107–109 m, (1).

Female: 7.21 mm, ovigerous female: 10.08 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Species recorded on bottoms of mud, sandy mud or sand, mostly mixed with broken shells, bryozoans, branched or foliate foraminifera, calcareous algae, corals and rocks. Bathymetrical range from 18 to 162 m (Manning & Holthuis 1981: 335 as *Parthenope notialis*). Ovigerous females have been reported in February, March, May, June, July, September and November (Zariquiey Álvarez, 1968: 441 as *Parthenope macrochelos*; Manning & Holthuis, 1981: 335 as *Parthenope notialis*).

Our specimens were captured from 102–104 m to 174 m, on coarse sand and muddy sand bottoms. Ovigerous females were collected in December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Mauritania (present work, see Remarks) to Angola (Manning & Holthuis, 1981: 335 as *Parthenope notialis*). Muñoz *et al*. (2012) reported this species from Guinea-Bissau.

REMARKS

This species was relocated by Tan & Ng (2007) in their new genus *Spinolambrus* erected to include some species of the subfamily Parthenopinae previously placed within the genera *Lambrus* and *Parthenope* from both the Atlantic and the Eastern Pacific.

Manning & Holthuis (1981) established the distribution range of this species at least from Senegal to Angola, inasmuch as the authors pointed out that most of the records of *S. macrochelos* (as *P. macrochelos*) from tropical West Africa were based on *S. notialis.* In consequence, they described the records of Maurin (1968; as *Lambrus macrocheles*) from the Western Sahara and Mauritanian waters as dubious, and a further taxonomical revision would assign them to *S. notialis* or *S. macrochelos*. The same occurs with the citation in Fransen (1991), although in this case Fransen referred to the specimens as "*Parthenope notialis*/*miersi*" [*Parthenope miersii* was synonymized with *S. macrochelos* (Tan, 2004)].

The southernmost distribution of *S. macrochelos* was confirmed by Tan & Low (2014) in Salé (Morocco) and the authors suggest that the distributions of *S. macrochelos* and *S. notialis* may overlap in Northwest Africa.

Our record off Banc d'Arguin confirms the presence of this species in Mauritanian waters and slightly extends its bathymetrical distribution.

The presence of ovigerous females in December confirms that this species spawns all the year round.

Superfamily PORTUNOIDEA Rafinesque, 1815

Family CARCINIDAE MacLeay, 1838

Genus *Liocarcinus* Stimpson, 1871

Liocarcinus corrugatus (Pennant, 1777)

(Figure 28 A – C)

Cancer Corrugatus Pennat, 1777: 5, pl. V fig. 9.

Liocarcinus corrugatus: Manning and Holthuis, 1981: 84 (references)

MATERIAL EXAMINED

MUBV08, 174–168 m, (2).

Male: 13.07 mm

IDENTIFICATION

Our specimen agrees well with those described by Zariquiey Álvarez (1968) and González-Gurriarán & Méndez (1986).

BIOLOGY

Mainly reported on coarse soft bottoms such as gravel, coarse sand, sandy mud, muddy sand and maerl beds (d'Udekem d'Acoz, 1999; as *Polybius* (*Necora*) *corrugatus;* Lakhrach *et al*., 2012), but also recorded on rocks and in *Posidonia oceanica* (Linnaeus) Delile, 1813 meadows (Pipitone & Arculeo, 2003; as *Polybius corrugatus*; Pipitone & Vaccaro, 2011). Depth records from 5–10 m (Pipitone & Arculeo, 2003; as *Polybius corrugatus*) to 147 m (d'Udekem d'Acoz, 1999; as *Polybius* (*Necora*) *corrugatus*). Ovigerous females reported from November to January, March, May, June and July (Zariquiey Álvarez, 1968; as *Macropipus corrugatus*; García Raso, 1984).

Only one male was captured during the MAURIT surveys, between 168 and 174 m.

GEOGRAPHICAL DISTRIBUTION

East Atlantic, from the Orkney Islands to Angola, including the Azores, Madeira, Canary and Cape Verde Islands; and Mediterranean Basin (d'Udekem d'Acoz, 1999: 219) (see Remarks). Further records in the literature (Abelló *et al*., 2002; García Raso & Manjón-Cabeza, 2002; Pipitone & Arculeo, 2003; as *Polybius corrugatus*; Ateş *et al*., 2006; García-Muñoz *et al*., 2008; Pipitone & Vaccaro, 2011; Lakhrach *et al*., 2012; Muñoz *et al*., 2012) fit well within this geographical distribution.

REMARKS

Liocarcinus corrugatus was also reported from many localities in the Indo-Pacific, but d'Udekem d'Acoz (1999) stated that all these records probably belong to one or more closely allied species. Ng *et al*. (2001) followed d'Udekem d'Acoz and excluded *L. corrugatus* from the checklist of brachyurans from Taiwan, but later Yaldwin and Webber (2011) included this species in the Decapoda checklist of New Zealand.

Our data slightly increase the bathymetric range previously reported in the literature.

Family GERYONIDAE Colosi, 1923

Genus *Chaceon* Manning & Holthuis, 1989

Chaceon maritae (Manning & Holthuis, 1981)

(Figures 29 A – B)

Geryon maritae Manning & Holthuis, 1981: 112, figs. 24a, 25, 26.

MATERIAL EXAMINED

MU01, 817–820 m, (2); MU15, 670–675 m, (1); MU17, 818–861 m, (3); MU18, 519–402 m, (40); MU19, 1222–1218 m, (1); MU23, 532–415 m, (2); MU26, 744 m, (1); MU33, 741–736 m, (2); MU46, 848–847 m, (3); MU48, 1239–1218 m, (1); MU55, 1310–1218 m, (1); MU56, 1091–1159 m, (1); MU62, 1236–1244 m, (1); MU67, 1381–1390 m, (1); MU68, 1136–1146 m, (5); MU70, 755–801 m, (3); MU73, 1330–1284 m, (1); MU79, 554–576 m, (5); MU126, 668–826 m, (2); MU177, 584–580 m, (9); MU182, 726 m, (1); MU188, 627 m, (1); MU243, 827–850 m, (3); MU267, 673–670 m, (16); MUBV03, 528–538 m, (1); MUBV13, 493–517 m, (1).

Males: 23.63–68.34 mm; females: 21.94–77.95 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Species inhabiting bottoms of mud, sandy mud and corals at depths from 100–300 m (Manning & Holthuis, 1981; as *Geryon maritae*) to 1994 m (Le Roux, 2001).

Although several works focus on the population dynamics of *C. maritae* for fishing purposes (Gaertner & Laloé, 1986; Melville Smith, 1988; Le Roux, 2001), surprisingly, none of them include data about the spawning period for this species.

Our specimens were collected between 402–519 m and 1381–1390 m on muddy sand and sandy mud bottoms.

GEOGRAPHICAL DISTRIBUTION

West Africa from the Western Sahara to Namibia (Manning & Holthuis, 1981; d'Udekem d'Acoz, 1999) (see Remarks). Le Roux (2001) reported this species off Namibia and Muñoz *et al*. (2012) from Guinea-Bissau.

REMARKS

Species occurrence in the Canary Islands (González *et al*., 1996) needs confirmation (d'Udekem d'Acoz, 1999).

Family MACROPIPIDAE Stephenson & Campbell, 1960
Genus *Bathynectes* Stimpson, 1871
Bathynectes piperitus Manning & Holthuis, 1981
(Figure 30)

Bathynectes piperitus Manning & Holthuis, 1981: 77, figs. 16, 17.

MATERIAL EXAMINED

MU02, 616–626 m, (1); MU14, 502–511 m, (6); MU15, 670–675 m, (1); MU18, 519–402 m, (31); MU23, 532–415 m (2); MU37, 403–442 m (5); MU44, 606–596 m, (14); MU45, 420–427 m, (2); MU51, 464–468 m, (2); MU52, 774–792 m, (2); MU54, 414–451 m, (1); MU57, 430–406 m, (1); MU63, 848–798 m, (59); MU64, 452–468 m, (11); MU70, 755–801 m, (1); MU71, 812–837 m, (6); MU79, 554–576 m, (2); MU123, 278–362 m, (1); MU126, 668–826 m, (3); MU127, 260–353 m, (1); MU134, 311–436 m, (1); MU143, 322 m, (2); MU175, 618–850 m, (2); MU177, 584–580 m, (2); MU179, 303–304 m, (1); MU214, 650–588 m, (1); MU222, 729–723 m, (2); MU267, 673–670 m, (1); MU276, 637–562 m, (1); MUBV02, 318–330 m, (6); MUBV03, 528–538 m, (4); MUBV09, 549–555 m, (10); MUBV10, 332–344 m, (4); MUBV13, 493–517 m (30); MUBV14, 300–281 m, (2); MUBV18, 559–574 m, (24); MUBV19, 306 m, (30); MUBV22, 300 m, (16); MUBV25, 499–520 m, (3).
Males: 13.60–55.06 mm; females: 13.13–41.98 mm; ovigerous females: 35.52–40.72 mm

IDENTIFICATION

Our specimens agree well with the original description.

BIOLOGY

Collected on mud, muddy sand, sand and gravel bottoms and on corals, in depths from 200 to 628 m. Ovigerous females recorded from February to June (Manning & Holthuis, 1981). Our specimens were captured at depths from 260–353 m to 618–850 m on sand and sandy mud bottoms. Ovigerous females were collected in November and December.

GEOGRAPHICAL DISTRIBUTION

Known in West Africa, from the Cape Verde Islands (Manning & Holthuis, 1981) and Mauritania (present work) to Namibia (Macpherson, 1991), the species is probably present up to Western Saharan waters (see Remarks). Henriksen (2009) reports this species off Gabon.

REMARKS

Specimens of *Bathynectes piperitus* have been largely identified under the name of the European and Mediterranean *B. maravigna* (Prestandrea, 1839). The differences between both species were summarized by Manning & Holthuis (1981). Our Mauritanian record of *B. piperitus* supports the opinion expressed by Manning & Holthuis (1981) that the records of *B. superbus* (= *B. maravigna*) from Cape Bojador (Western Sahara) and Mauritania, given by Maurin (1968), and those of *Bathynectes,* given by Filhol (1885a), may in fact be referable to *B. piperitus*.
Our records of ovigerous females determine a spawning period between November and June.

Genus *Macropipus* Prestandrea, 1833
Macropipus rugosus (Doflein, 1904)
(Figure 31)

Elliptodactylus rugosus Doflein, 1904: 94, pl. XXX figs. 1–3, pl. XXXII fig. 7.
Macropipus rugosus Manning & Holthuis, 1981: 86 (references)

MATERIAL EXAMINED

MU86, 91–103 m, (3); MU90, 110 m, (6); MU101, 104–96 m, (2304); MU120, 109–105 m, (1); MU125, 103–101 m, (132); MU135, 185–173 m, (25); MU137, 81–84 m, (1); MU138, 123–130 m, (233); MU144, 119–138 m, (8); MU147, 134–139 m, (7); MU148, 215–245 m, (106); MU149, 93–146 m, (5); MU154, 92–102 m, (4819); MU155, 210–257 m, (25); MU160, 143–147 m, (565); MU161, 89–92 m, (6); MU162, 148–149 m, (232); MU166, 87–85 m, (37); MU167, 101–108 m, (354); MU168, 87–92 m, (1); MU181, 142–148 m, (18); MU184, 213–202 m, (54); MU186, 174 m, (1); MU205, 89–93 m, (1); MU208, 96–79 m, (1); MU224, 173–177 m, (12); MU227, 183–181 m, (3); MU266, 103 m, (57); MU285, 128–132 m, (31); MU291, 106–137 m, (256); MUBV01, 112 m, (1); MUBV21, 107–109 m, (4).

Males: 7.39–32.41 mm, females: 7.43–24.95 mm, ovigerous females: 18.49–23.43 mm

IDENTIFICATION

Our specimens agree well with the original description and with the notes provided by Guinot (1961: 2).

BIOLOGY

Bottoms of mud, muddy sand, sand, broken shells, foraminifera, bryozoans and also on calcareous algae and rocks, at depths from 5 to 400 m. Ovigerous females previously recorded in June and September (Manning & Holthuis, 1981: 86).

Our specimens were captured between 81–84 m and 210–257 m on muddy sand, sandy mud, coarse muddy sand, sand and on coarse sand with shell debris bottoms. Ovigerous females were collected in November and December.

GEOGRAPHICAL DISTRIBUTION

West Africa from Western Sahara to Angola, including São Tomé and Príncipe Islands (Manning & Holthuis, 1981: 86). Further records from Nigeria, Principe and Congo (Henriksen, 2009) and Guinea-Bissau (Muñoz *et al*., 2012).

REMARKS

Ovigerous females were reported for the first time at the end of the year, indicating that this species spawns in the second half of the year.

Superfamily XANTHOIDEA MacLeay, 1838

Family XANTHIDAE MacLeay, 1838

Genus *Monodaeus* Guinot, 1967

Monodaeus cristulatus Guinot & Macpherson, 1988

(Figures 32 A – C, 33 E – H)

Monodaeus cristulatus Guinot & Macpherson, 1988: 744, figs. 8, 9, 14, 19, 20, 25, 26, pl. 3 figs. D–G.

MATERIAL EXAMINED

MU120, 109–105 m, (1); MU171, 105–100 m, (5); MU212, 163–200 m, (1); MU219, 125–129 m, (1); MU290, 311 m, (1); MUBV08, 174–168 m, (2); MUBV10, 332–344 m, (12); MUBV14, 300–281 m (1).

Males: 4.36–14.08 mm, females: 3.53–4.96 mm, ovigerous female: 6.57mm

COMPARATIVE MATERIAL EXAMINED

Monodaeus cristulatus: **Namibia**, Exp. Benguela XII, stn. P42, 185 m, 28° 56′ 59.99″ S, 14° 55′ 47.99″ E, Macpherson, E. det., 10 specimens (USNM 221965); Exp. Benguela XIV, stn. P53, 179–183 m, 29° 19′ S, 15° 05′ E, Macpherson, E. det., three specimens: 1 male CL: 15.58 mm (ICMD000034) and two juveniles CL: 4.30 mm (ICMD000037) and 3.77 mm (ICMD000039).

Monodaeus couchii (Couch, 1851): **Gulf of Cádiz**, Exp. ARSA0311, stn. L14, 692 m, 36° 12' 54.0" N 7° 00' 32.4" W, 2 females CL: 11.31 and 9.20 mm (IEO-CD-AR11/001); stn L31, 359 m, 36° 02' 27.6" N 6° 20' 09.6" W, 1 male CL: 7.31 mm (IEO-CD-AR11/017). **Morocco** (Atlantic coast): Exp. CCLME 2012, stn. 297, 239 m, 34° 52' 03.0" N 6° 45' 24.1" W, 1 female CL: 14.23 mm (IEO-CD-CCLME12/1226). **NW Mediterranean**: Barcelona, Exp. Pont 90, stn. G3, 192–430 m, 41° 07' 59.9" N 2° 03' 00.0" E, Sardá, F. det., 4 specimens: 2 males CL: 22.11 mm (ICMD 291/1981(s01)) and 22.42 mm (ICMD 291/1981(s02)), 2 ovigerous females CL: 17.03 mm (ICMD 291/1981(s03)) and 14.25 mm (ICMD 291/1981(s04)). **SW Mediterranean**: Málaga, Exp. Medits94 stn. Lance 16, 553–563 m, 36° 23' 48.1" N 4° 28' 54.5" W (off Pta. Calaburras), Abelló, P. det., 1 female CL: 12.34 mm (ICMD000005); Exp. Medits97 stn. Lance 6, 721–735 m, 36° 18' 33.1" N 4° 44' 34.1" W (off Marbella), Abelló, P. det., 1 male CL: 16.09 mm (ICMD000013); Exp. Medits97 stn. Lance 19, 524–526 m, 36° 36' 59.4" N 3° 48' 56.8" W (off Nerja), Abelló, P. det., 1 male CL: 20.60 mm (ICMD000017).

IDENTIFICATION

Our specimens agree with the original description (see Remarks).

BIOLOGY

This species was captured on coral, at depths from 160 to 300 m; ovigerous females were reported from July and August (label with paratypes ICMD000031, ICMD000032 and ICMD000033; Guinot & Macpherson, 1988: 744).

Our specimens were found on sandy bottoms and hidden in the holes of large stones hauled up in the net, at depths from 100–105 m to 332–344 m. The ovigerous female was captured in December.

GEOGRAPHICAL DISTRIBUTION

Western Africa in Mauritania (present work) and Namibia (Guinot & Macpherson, 1988) (see Remarks).

REMARKS

Monodaeus cristulatus has only been previously reported from Namibian coasts (28°–29° S). Following Guinot & Macpherson (1988), the closest species is *Monodaeus couchii,* previously reported from various localities of NW Africa (Manning & Holthuis, 1981), including Mauritanian waters (Milne-Edwards & Bouvier, 1900; Anadon, 1981; Fransen, 1991). We have compared our material with specimens of *M. cristulatus* from Namibia and with samples of *M. couchii* from the Western Mediterranean, Gulf of Cádiz and Moroccan Atlantic coasts (see comparative material examined). After these comparisons, we included our specimens in *M. cristulatus*, due to the presence of a dorsal crest on P2 to P5 meri and a proximal protuberance on P2 to P4 dorsal carpi (Figure 33 E – H), which are absent in *M. couchii* (Figure 33 A – D). In juveniles of *M. cristulatus* the specific characters are not clearly developed (Guinot & Macpherson, 1988), which hinders species separation when studying isolated specimens. However, checking a series of different features on specimens of various sizes allows for accurate identification.

The possible misidentification of the two species and our findings of *Monodaeus cristulatus* in Mauritanian waters point to a need for a revision of the records of *M. couchii* south of Cape Blanc. Our records suggest that *M. cristulatus* can be found along the West African coast between Banc d'Arguin and Namibia.

Subsection THORACOTREMATA Guinot, 1977
Superfamily GRAPSOIDEA MacLeay, 1838
Family PLAGUSIIDAE Dana, 1851
Genus *Euchirograpsus* H. Milne-Edwards, 1853
Euchirograpsus liguricus H. Milne-Edwards, 1853

(Figure 34)

Euchirograpsus liguricus H. Milne-Edwards, 1853: 175; Türkay, 1975: 105, figs. 1–3, 17, 23 (references)

MATERIAL EXAMINED

MU290, 311 m, (3); MUBV14, 300–281 m, (3).
Males: 6.61–20.68 mm; females: 6.30–11.39 mm

IDENTIFICATION

Our specimens agree well with the description provided by Türkay (1975: 105) and with the comments and pictures after Giacobbe & Spano (2006).

BIOLOGY

Collected on gravel, shell, sand, sandy mud and muddy bottoms, the species is also recorded on bottoms of rock with gorgonians, sponges, calcareous algae and kelp, and coral reefs (Manning & Holthuis, 1981: 248; d'Udekem d'Acoz, 1999: 250, Giacobbe & Spano, 2006). Depth records range between 10 m (d'Udekem d'Acoz, 1999: 250) and 620–621 m (Abelló *et al*., 2002). Ovigerous females were collected only in March (Manning & Holthuis, 1981).
Our material was collected at 281–300 m and 311 m. The species was caught in a ghost net hauled with the Lofoten trawl and in the holes of a large stone captured with the Agassiz trawl.

GEOGRAPHICAL DISTRIBUTION

East Atlantic from West Portugal to Namibia including the Azores, Madeira, Savage, Canary and Cape Verde Islands; Western and Central Mediterranean Sea (d'Udekem d'Acoz, 1999; Giacobbe & Spano, 2006). Abelló *et al*. (2002) report this species from the Eastern Alborán Sea.

DISCUSSION

A total of 10,514 brachyuran specimens were studied from waters off Mauritania at depths from 79 to 1867 m, comprising 33 species belonging to 17 families and 24 genera. The brachyuran diversity found in recent works carried out with a similar methodology on West African coasts is slightly lower than the values of our study. García Raso (1996) reported 31 brachyuran species from the Ibero-Moroccan Bay and adjacent waters at depths from 137 to 2142 m; Muñoz *et al*. (2012) listed 44 brachyuran species off Guinea-Bissau at depths between 20 and 1000 m, of which only 24 were found deeper than 80 m; and Macpherson (1991) included 21 brachyuran species in Namibian waters from 100 to 1000 m.
The most abundant species so far was *Macropipus rugosus* (89%), mainly due to the high number of specimens captured at two stations off Nouakchott (MU101, 2304 specimens; MU154, 4819 specimens). However, the remaining stations showed similar abundances to those reported for this species in Guinea-Bissau (Muñoz *et al*., 2012), Guinea (Le Loeuf, 1993) and the Gulf of Guinea (Henriksen, 2009). Conversely, the following three species, *Atelecyclus rotundatus*, *Macropodia longipes* and *Ethusa rosacea*, were represented by only one specimen each. The low abundance of *A. rotundatus* is probably explained by its burrowing behaviour (González-Gurriarán & Méndez, 1986; S. de Matos-Pita unpublished data), which hinders or prevents the capture of the species by the trawl. *Macropodia longipes*, although reported from the Gulf of Gascogne to the Cape Verde Islands and the Mediterranean Sea, has only been recorded in Mauritanian waters on the Banc d'Arguin (Forest 1978, as *Macropodia tenuirostris longipes*). *Macropodia longipes* and *E. rosacea* are both considered as rare species because they were seldom reported and always in very low abundance (Monod, 1956; Manning & Holthuis, 1981; Henriksen, 2009).

Different patterns are observed for the latitudinal distribution of the species in the area studied. Eleven species, *Acanthocarpus brevispinis*, *Bathynectes piperitus*, *Chaceon maritae*, *Goneplax barnardi*, *Monodaeus cristulatus*, *Macropodia gilsoni*, *Inachus angolensis*, *Macropipus rugosus*, *Homola barbata*, *Macropodia macrocheles* and *Paromola cuvieri*, are evenly distributed along most of the Mauritanian coast. Three species, *Eurynome aspera*, *Distolambrus maltzami* and *Medorippe lanata*, were sampled only north of Cape Timiris, and another six, *Pisa armata*, *Macropodia hesperiae*, *Euchirograpsus liguricus*, *M. longipes*, *Inachus aguiarii* and *E. rosacea* were only captured between Cape Timiris and the Senegalese border. *Ethusa rugulosa*, *Inachus nanus*, *Inachus grallator*, *Calappa pelii, Goneplax rhomboides*, *Solenolambrus noordendei*, *Spinolambrus notialis* and *Pseudomyra mbizi* were scarcely sampled north and south of Cape Timiris. Finally, another five species, *Inachus leptochirus*, *Cymonomus granulatus*, *Ebalia nux*, *Liocarcinus corrugatus* and *A. rotundatus*, were sampled only off Cape Blanc.

Analysis of the geographical distribution reveals three different contingents within the Mauritanian brachyuran fauna. The main zoogeographical group (18 species, 54.5%) is composed of species distributed along the West African coast, mainly in the tropical region. Within this group, 14 species, *A. brevispinis*, *C. maritae*, *B. piperitus*, *C. pelii*, *Inachus angolensis*, *G. barnardi*, *M. rugosus*, *M. macrocheles*, *E. rosacea*, *S. noordendei*, *P. mbizi*, *E. rugulosa*, *M. gilsoni* and *S. notialis*, were mostly evenly reported from the Western Sahara and Mauritania to Angola and Namibia. Two species, *I. nanus* and *M. hesperiae*, were reported between Mauritania and the Gulf of Guinea. *Inachus grallator*, previously reported between the Gulf of Guinea and Namibia, and *M. cristulatus*, only known from the type locality (Namibia), have a discontinuous latitudinal distribution and are now both recorded in Mauritanian waters. Species with a restricted and/or discontinuous distribution in tropical West Africa have been reported in recent decades (Manning & Holthuis, 1981; Macpherson, 1988), but a more complete sampling effort in West African waters will certainly extend their known distribution. The second zoogeographical group (10 species, 30.3%) is represented by species widely distributed in the Lusitanian province, including the Mediterranean Sea. The southern limit of the Lusitanian province was recently established at Cape Juby (south Morocco) by Briggs & Bowen (2012), but set up at Cap Vert (Senegal) by Briggs (1995). *Macropodia longipes* is the only species with a strictly Lusitanian distribution, while the distributional limits of the remaining species extend further northwards or southwards. Five species range southwards to Guinea (*I. aguiarii*), Angola (*D. maltzami*), Namibia (*E. liguricus*), South Africa (*H. barbata*) and even into the Indian Ocean up to Mozambican waters (*M. lanata*). Another four species, *G. rhomboides*, *E. nux*, *C. granulatus* and *I. leptochirus*, extend their distribution area to northern European seas.

Finally, the third zoogeographical group includes five species (15%) widely distributed in the E Atlantic and Mediterranean, with records from northern European seas southwards to Angola (*L. corrugatus* and *P. armata*), South Africa (*A. rotundatus* and *P. cuvieri*) and even to Durban in the West Indian Ocean (*E. aspera*).

In this region, the affinity with Atlantic-Mediterranean fauna was previously reported for different taxa: Porifera (van Soest, 1993), Hydrozoa (Ansín Agís *et al*., 2001), Bryozoa (Aristegui & Cruz, 1986) and Echinodermata (Hernández *et al*., 2013; Calero *et al*., in preparation). For all these taxa, the Canary Current was highlighted as the main means of larval dispersion southwards, also enabling the presence of typical boreal species, such as *G. rhomboides*, *E. nux*, *C. granulatus* and *I. leptochirus*, in NW African waters. Conversely, the presence of tropical species in Mauritania (*C. maritae*, *B. piperitus*, *C. pelii*, *I. angolensis*, *G. barnardi*, *M. rugosus*, *M. macrocheles*, *I. grallator*, *E. rosacea*, *S. noordendei*, *P. mbizi*, *E. rugulosa*, *M. gilsoni*, *S. notialis*, *I. nanus* and *M. hesperiae*) is more difficult to explain because of dominant current systems precluding their dispersion northwards (Aristegui & Cruz, 1986; Hernández *et al*., 2013). However, a thin surface coastal current flowing northwards along the Gabonese and Congolese coasts (Stramma & Schott, 1999), and the so-called

'Mauritania Current' (Stramma & Schott, 1999) flowing northwards in summer and autumn between Cap Vert and Cape Blanc (Pastor *et al*., 2008), probably facilitate the northwards dispersion of tropical species along the West African coastline. The importance of small currents in the dispersion of species was highlighted by Briggs (1995) as the main way of successfully transporting species in an opposite direction to that of the main flow across the Tropical Pacific and the Atlantic Oceans.

There are three bathymetrical groups of brachyurans in Mauritanian waters. The first group includes 13 species collected exclusively on the shelf (80–200 m; *M. hesperiae*, *D. maltzami*, *I. aguiarii*, *M. longipes*, *M. lanata*, *C. pelii*, *P. armata*, *P. mbizi*, *E. aspera*, *L. corrugatus*, *S. notialis*, *M. gilsoni* and *I. nanus*); the second is represented by nine species collected both on the shelf and upper slope (80–400 m; *M. rugosus*, *I. angolensis*, *S. noordendei*, *H. barbata*, *I. leptochirus*, *M. cristulatus*, *G. rombhoides*, *E. rugulosa* and *M. macrocheles*); and the third accounts for nine species exclusively recorded along the upper slope (300–700 m; *E. nux*, *E. liguricus*, *I. grallator*, *A. rotundatus*, *C. granulatus*, *A. brevispinis*, *G. barnardi*, *B. piperitus* and *P. cuvieri*) (Figure 35). In addition, *C. maritae* was collected on the upper and middle slope (460–1385 m) and *E. rosacea* only at 1024 m.

Despite the increase in decapod diversity with depth described in several regions, peaking between 1000 and 2000 m (see Muñoz *et al*., 2012 for references), brachyuran crabs seem not follow this general trend in Mauritanian waters.

Our results emphasize the highest specific richness of the deep shelf (22 species, 66. 66%) and its drastic reduction beyond 700 m (two species, 6.06%). The importance of crustaceans and at least of some brachyuran families (Inachidae, Portunidae, Parthenopidae and Dorippiidae) on the Mauritanian deep shelf was previously pointed out by Duineveld *et al*. (1993). A similar bathymetrical pattern was described for the brachyurans off Guinea-Bissau by Muñoz *et al.* (2012), clearly dominated by shelf species and only three typical deep species, which also include *C. maritae*. Soto (1991) also reported a strong reduction in species diversity beyond 500 and 700 m in the Straits of Florida. This reduction was related to the high trophic level of brachyurans and the more limited food availability in deep waters (Escobar-Briones *et al.*, 2008).

Analysis of bathymetrical ranges shows that in Mauritanian waters all but three of the studied species are stenobathic, with depth ranges narrower than 300 m (Menzies *et al*., 1973; Pielou, 1992). Only *B. piperitus*, *P. cuvieri* and *C. maritae* (depth ranges of 322 m, 397 m and 925 m, respectively) can be considered eurybathic species. However, considering data from the literature, only 13 of the studied species are stenobathic (*M. hesperiae*, *I. aguiarii*, *M. cristulatus*, *I. nanus*, *P. armata*, *S. notialis*, *L. corrugatus*, *I. grallator*, *E. rugulosa*, *M. macrocheles*, *M. gilsoni*, *S. noordendei*, *P. mbizi*). In consequence, the Mauritanian brachyuran fauna is dominated by eurybathic species, a feature also shared with the brachyurans of the Straits of Florida (Soto, 1991).

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Map 1. Sampling area showing the location of the MAURIT stations with presence of brachyurans.

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Fig. 1. *Homola barbata* (Fabricius, 1793), ovigerous female CL: 21.11 mm dorsal view, MU281.

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Fig. 3. *Cymonomus granulatus* (Norman, in Thomson, 1873), adult dorsal view, MUBV10.

Fig. 4. *Acanthocarpus brevispinis* Monod, 1946, adult dorsal view, MU51.

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Fig. 9. *Ethusa rugulosa* A. Milne-Edwards & Bouvier, 1897, adult male dorsal view, MUBV21.

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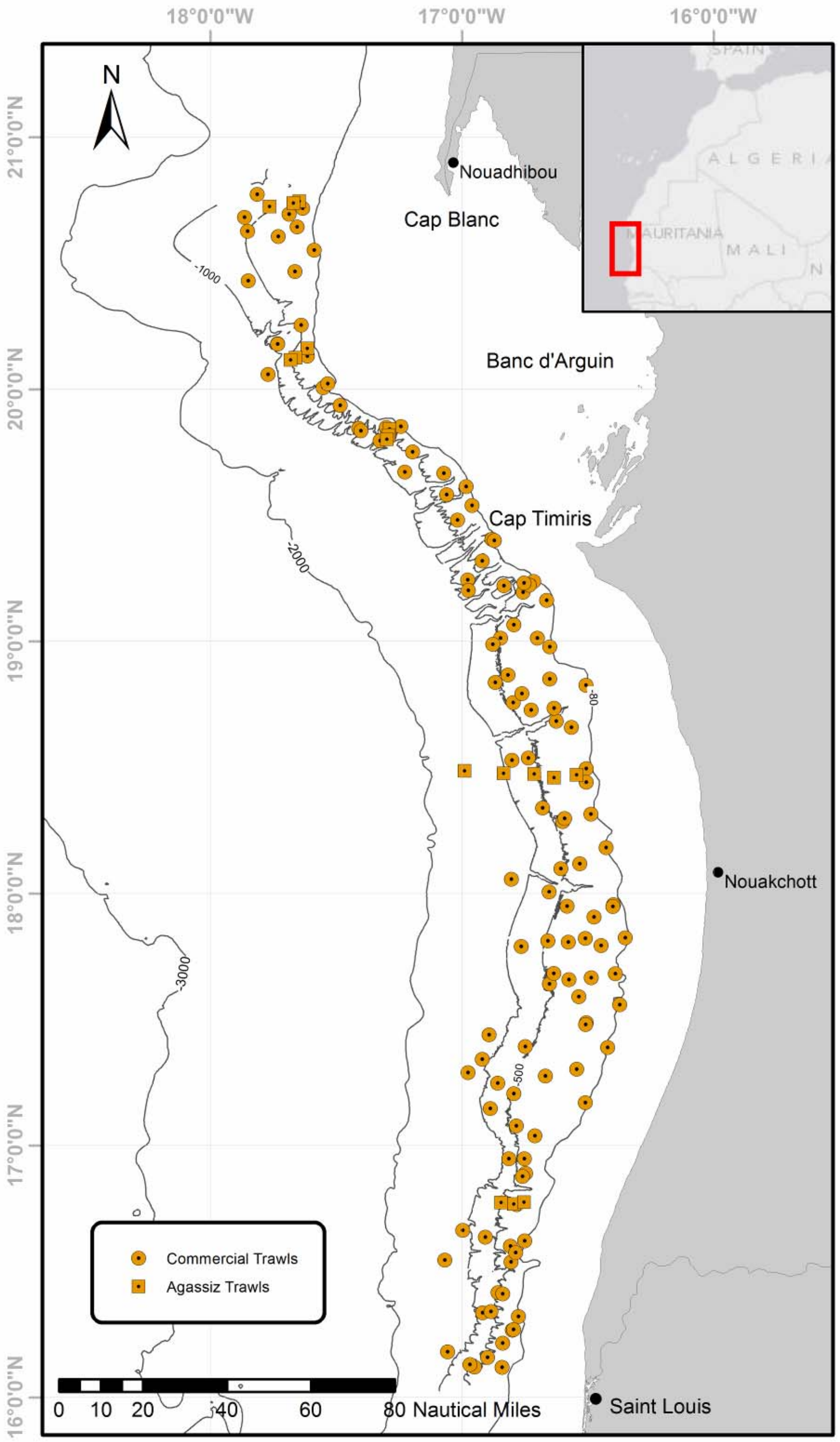
Contribution to the knowledge of the deep brachyuran fauna (Crustacea: Decapoda) in waters off Mauritania (NW Africa)

Map and Figures



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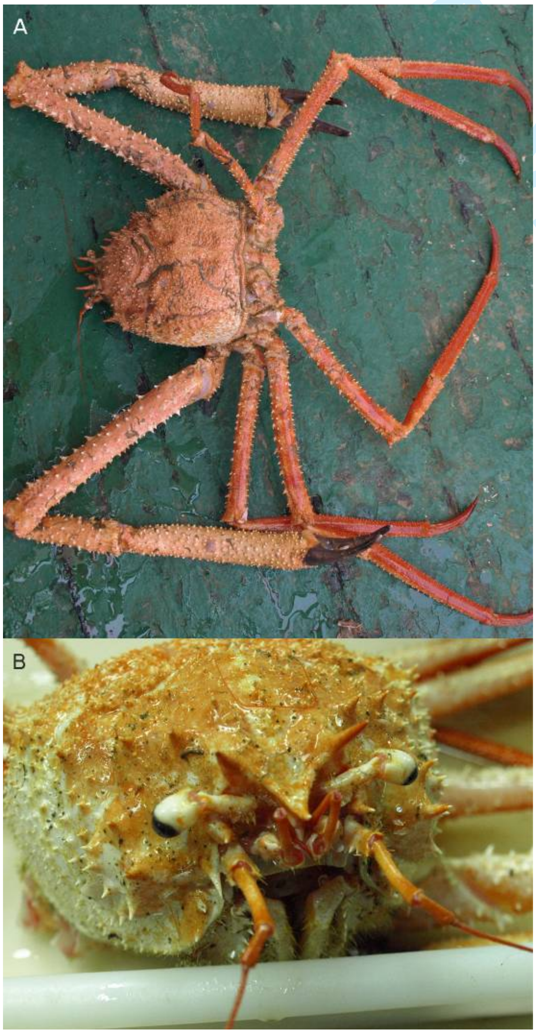

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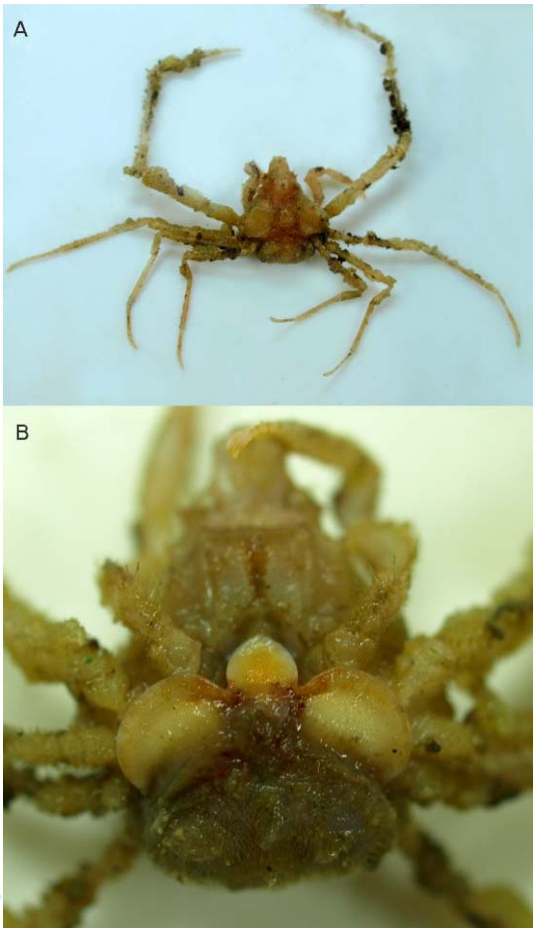

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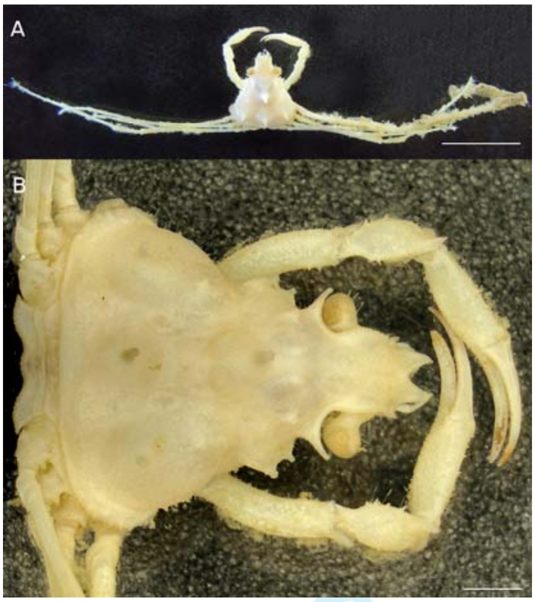

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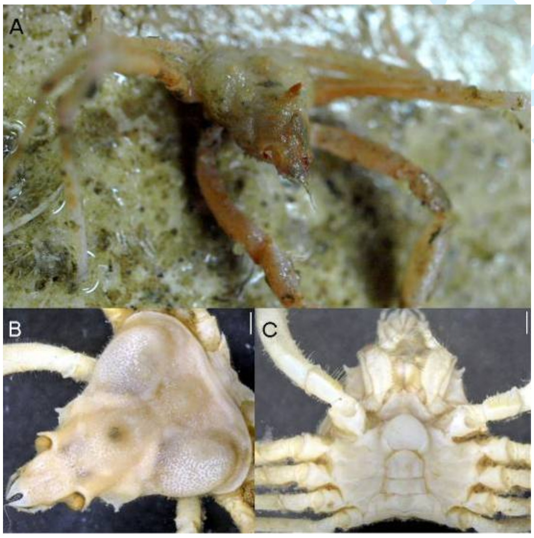

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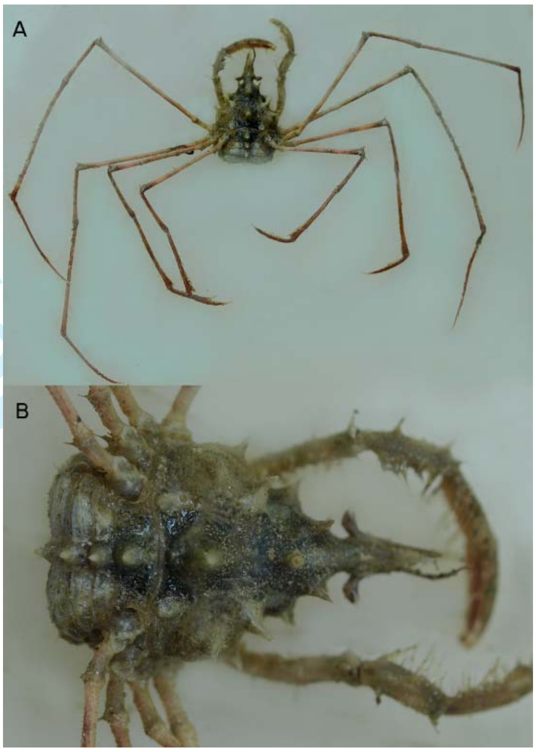

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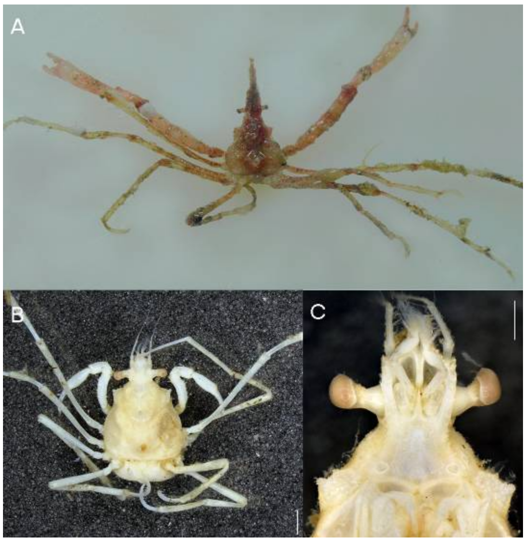

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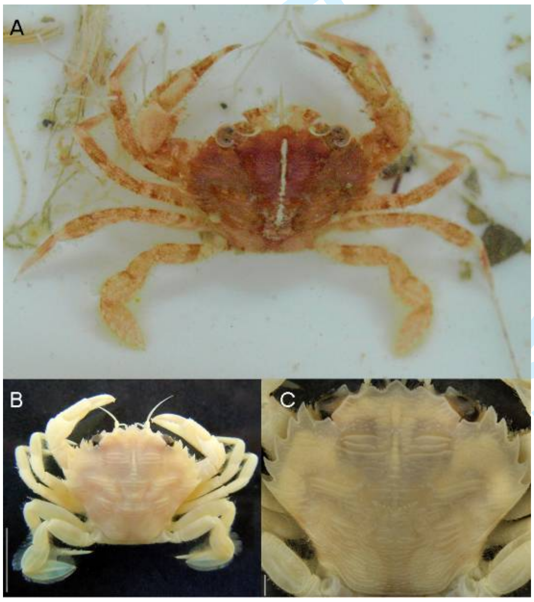

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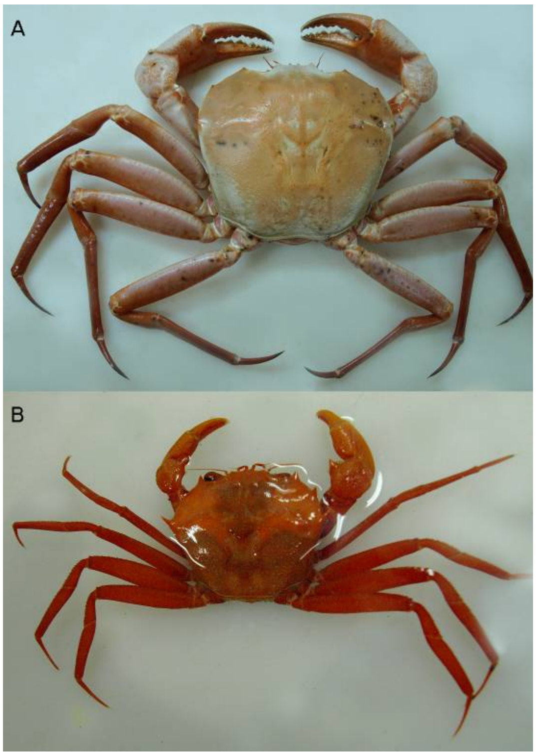

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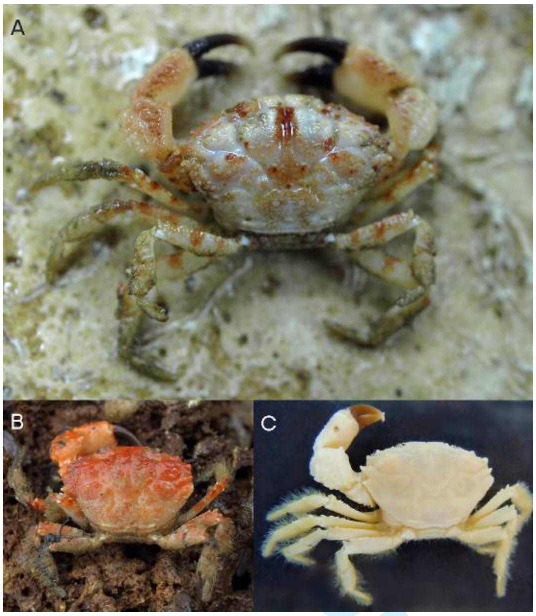

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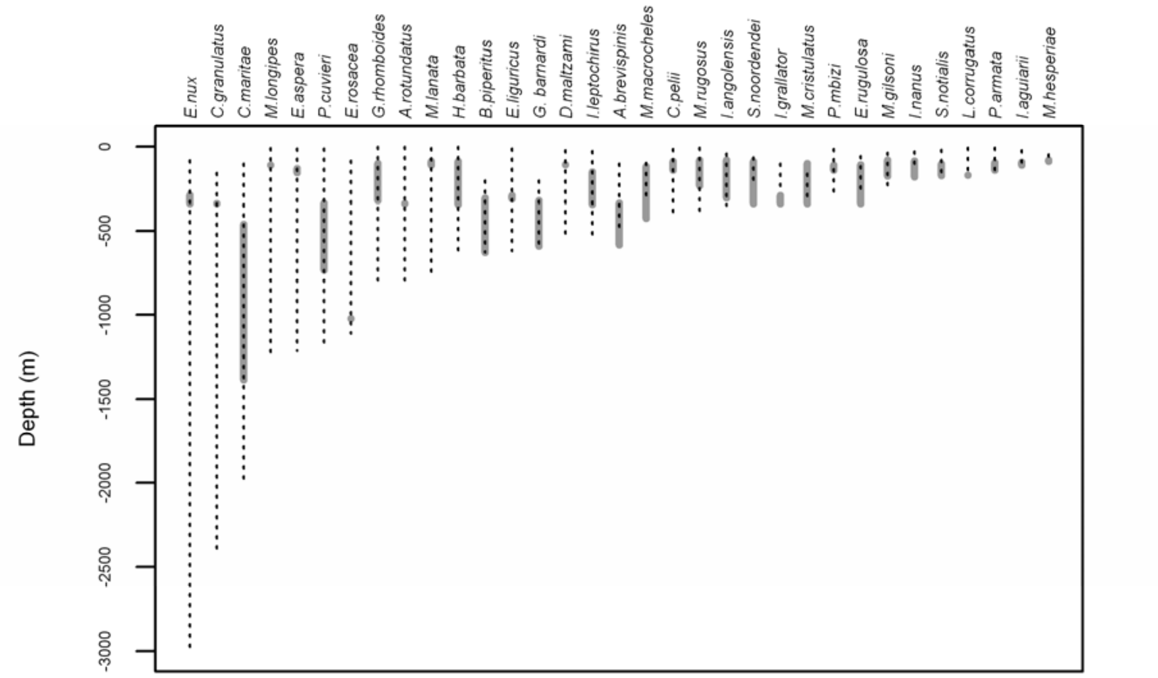

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Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
MU01	17/11/2007	20º46´60"	17º47´44"	817	20º45´54"	17º49´51"	820	*Chaceon maritae*
MU02	17/11/2007	20º42´00"	17º50´30"	616	20º40´01"	17º53´04"	626	*Bathynectes piperitus*
MU14	21/11/2007	20º39´01"	17º50´15"	502	20º36´18"	17º51´50"	511	*Bathynectes piperitus, Paromola cuvieri*
MU15	21/11/2007	20º27´14"	17º51´47"	670	20º24´31"	17º50´04"	675	*Bathynectes piperitus, Chaceon maritae*
MU17	22/11/2007	20º10´22"	17º42´24"	818	20º11´25"	17º45´26"	861	*Chaceon maritae*
MU18	22/11/2007	20º14´01"	17º39´16"	519	20º16´37"	17º37´16"	402	*Bathynectes piperitus, Chaceon maritae, Paromola cuvieri*
MU19	22/11/2007	20º05´04"	17º46´18"	1222	20º02´05"	17º46´09"	1218	*Chaceon maritae*
MU23	24/11/2007	19º50´44"	17º25´25"	532	19º50´46"	17º23´48"	415	*Bathynectes piperitus, Chaceon maritae, Paromola cuvieri*
MU26	25/11/2007	19º39´08"	17º12´32"	744	19º41´31"	17º14´38"	744	*Chaceon maritae*
MU33	27/11/2007	19º15´21"	16º59´38"	741	19º13´57"	16º57´33"	736	*Chaceon maritae*
MU37	29/11/2007	19º02´16"	16º50´40"	403	18º59´15"	16º50´52"	442	*Bathynectes piperitus, Paromola cuvieri*
MU44	01/12/2007	18º30´41"	16º43´46"	606	18º33´41"	16º44´31"	596	*Bathynectes piperitus, Goneplax barnardi*
MU45	01/12/2007	18º44´11"	16º46´53"	420	18º46´41"	16º48´40"	427	*Bathynectes piperitus*
MU46	01/12/2007	18º33´12"	16º48´22"	848	18º30´14"	16º47´40"	847	*Chaceon maritae*
MU48	02/12/2007	18º01´53"	16º48´35"	1239	18º04´51"	16º47´49"	1218	*Chaceon maritae*
MU51	03/12/2007	17º47´32"	16º39´47"	464	17º49´51"	16º39´13"	468	*Acanthocarpus brevispinis, Bathynectes piperitus*
MU52	03/12/2007	17º48´50"	16º45´25"	774	17º45´54"	16º46´14"	792	*Bathynectes piperitus*
MU54	03/12/2007	17º39´49"	16º39´02"	414	17º36´58"	16º39´10"	451	*Bathynectes piperitus, Goneplax barnardi*
MU55	04/12/2007	17º26´37"	16º54´13"	1310	17º25´58"	16º52´49"	1218	*Chaceon maritae*
MU56	04/12/2007	17º19´07"	16º55´48"	1091	17º21´53"	16º54´26"	1159	*Chaceon maritae*
MU57	04/12/2007	17º11´05"	16º47´52"	430	17º13´32"	16º47´20"	406	*Bathynectes piperitus, Goneplax barnardi*
MU62	06/12/2007	16º09´35"	17º04´18"	1236	16º12´06"	17º02´32"	1244	*Chaceon maritae*
MU63	06/12/2007	16º18´39"	16º55´12"	848	16º21´32"	16º54´59"	798	*Bathynectes piperitus*
MU64	06/12/2007	16º23´28"	16º51´44"	452	16º26´24"	16º51´01"	468	*Bathynectes piperitus*
MU67	07/12/2007	16º31´10"	17º04´27"	1381	16º34´09"	17º03´38"	1390	*Chaceon maritae*
MU68	07/12/2007	16º38´19"	16º59´29"	1136	16º41´10"	17º00´05"	1146	*Chaceon maritae*
MU70	08/12/2007	16º55´14"	16º48´39"	755	16º58´20"	16º48´53"	801	*Bathynectes piperitus, Chaceon maritae*
MU71	08/12/2007	17º07´09"	16º52´54"	812	17º10´16"	16º53´27"	837	*Bathynectes piperitus*

Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
MU73	09/12/2007	17º15´50"	16º58´10"	1330	17º18´42"	16º58´55"	1284	*Chaceon maritae*
MU79	11/12/2007	18º04´20"	16º36´39"	554	18º07´20"	16º36´07"	576	*Bathynectes piperitus, Chaceon maritae*
MU86	19/11/2008	20º44´40"	17º37´37"	91	20º41´40"	17º38´19"	103	*Macropipus rugosus, Solenolambrus noordendei*
MU87	19/11/2008	20º37´29"	17º42´37"	271	20º35´19"	17º44´55"	305	*Ebalia nux, Homola barbata*
MU88	19/11/2008	20º29´25"	17º39´03"	94	20º26´46"	17º40´35"	120	*Homola barbata, Inachus angolensis*
MU90	20/11/2008	20º09´23"	17º36´47"	110	20º06´30"	17º36´48"	110	*Macropipus rugosus*
MU99	23/11/2008	18º21´45"	16º41´12"	569	18º18´55"	16º40´20"	598	*Acanthocarpus brevispinis*
MU100	23/11/2008	18º08´43"	16º32´09"	236	18º05´23"	16º31´34"	238	*Macropodia macrocheles*
MU101	23/11/2008	17º58´45"	16º24´17"	104	17º55´53"	16º23´27"	96	*Macropipus rugosus*
MU105	24/11/2008	17º58´21"	16º34´32"	343	17º55´27"	16º35´19"	346	*Macropodia macrocheles*
MU119	29/11/2008	17º31´58"	16º23´00"	82	17º34´58"	16º21´47"	80	*Homola barbata, Macropodia gilsoni, Macropodia hesperiae*
MU120	30/11/2008	16º05´49"	16º51´20"	109	16º08´23"	16º49´32"	105	*Homola barbata, Inachus aguiarii, Macropipus rugosus, Macropodia gilsoni, Monodaeus cristulatus, Pisa armata*
MU121	30/11/2008	16º10´05"	16º53´01"	274	16º08´48"	16º54´43"	400	*Acanthocarpus brevispinis, Paromola cuvieri*
MU122	30/11/2008	16º17´53"	16º47´08"	107	16º20´35"	16º45´47"	97	*Homola barbata*
MU123	30/11/2008	16º23´07"	16º50´01"	278	16º26´08"	16º50´26"	362	*Goneplax barnardi*
MU125	01/12/2008	16º35´49"	16º45´35"	103	16º38´39"	16º44´29"	101	*Macropipus rugosus*
MU126	01/12/2008	16º36´35"	16º54´20"	668	16º39´42"	16º54´26"	826	*Bathynectes piperitus, Chaceon maritae*
MU127	01/12/2008	16º37´29"	16º48´23"	260	16º34´28"	16º48´28"	353	*Bathynectes piperitus*
MU128	01/12/2008	16º33´15"	16º48´07"	218	16º31´09"	16º48´27"	404	*Homola barbata*
MU129	02/12/2008	16º52´43"	16º45´08"	95	16º53´53"	16º44´25"	93	*Inachus aguiarii, Macropodia hesperiae, Spinolambrus notialis*
MU130	02/12/2008	16º44´31"	16º46´48"	252	16º47´12"	16º47´01"	362	*Inachus angolensis*
MU131	02/12/2008	17º00´55"	16º43´21"	102	17º03´33"	16º41´50"	104	*Homola barbata, Inachus aguiarii, Macropodia gilsoni, Pisa armata, Spinolambrus notialis*
MU133	02/12/2008	17º08´44"	16º31´19"	87	17º11´31"	16º29´49"	87	*Inachus angolensis*
MU134	03/12/2008	17º06´06"	16º46´45"	311	17º03´10"	16º47´13"	436	*Acanthocarpus brevispinis, Bathynectes piperitus*
MU135	03/12/2008	17º15´20"	16º41´04"	185	17º17´38"	16º39´07"	173	*Macropipus rugosus*
MU136	03/12/2008	17º16´40"	16º33´04"	103	17º19´34"	16º32´06"	112	*Pisa armata*
MU137	03/12/2008	17º21´43"	16º25´29"	81	17º24´47"	16º25´00"	84	*Inachus angolensis, Macropipus rugosus*

Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
MU138	04/12/2008	17º27´42"	16º30´29"	123	17º30´44"	16º30´12"	130	*Macropipus rugosus, Macropodia gilsoni*
MU139	04/12/2008	17º39´19"	16º23´23"	96	17º42´25"	16º23´20"	97	*Macropodia gilsoni, Pisa armata*
MU140	04/12/2008	17º39´25"	16º38´11"	376	17º42´28"	16º38´00"	377	*Paromola cuvieri*
MU141	04/12/2008	17º46´56"	16º34´53"	280	17º49´52"	16º34´16"	277	*Macropodia macrocheles*
MU143	05/12/2008	18º15´41"	16º35´16"	322	18º18´29"	16º36´34"	322	*Acanthocarpus brevispinis, Bathynectes piperitus, Goneplax rhomboides*
MU144	05/12/2008	18º17´21"	16º29´14"	119	18º20´19"	16º29´12"	138	*Macropipus rugosus*
MU147	06/12/2008	18º41´01"	16º34´31"	134	18º38´04"	16º33´14"	139	*Macropipus rugosus, Pisa armata*
MU148	06/12/2008	18º42´02"	16º36´28"	215	18º39´56"	16º38´29"	245	*Macropipus rugosus*
MU149	06/12/2008	18º47´59"	16º30´21"	93	18º51´05"	16º30´26"	146	*Macropipus rugosus, Macropodia gilsoni, Macropodia macrocheles*
MU150	07/12/2008	18º44´54"	16º44´10"	292	18º42´20"	16º42´42"	341	*Paromola cuvieri*
MU151	07/12/2008	18º49´50"	16º38´03"	110	18º52´17"	16º39´59"	134	*Macropodia gilsoni*
MU152	07/12/2008	18º50´25"	16º48´58"	381	18º53´35"	16º49´03"	316	*Goneplax barnardi*
MU154	08/12/2008	18º57´13"	16º38´48"	92	19º00´10"	16º39´13"	102	*Macropipus rugosus, Macropodia hesperiae, Pisa armata*
MU155	08/12/2008	19º04´38"	16º46´17"	210	19º03´18"	16º48´58"	257	*Macropipus rugosus, Macropodia macrocheles*
MU156	08/12/2008	19º08´17"	16º39´56"	107	19º11´17"	16º39´40"	102	*Macropodia gilsoni*
MU157	08/12/2008	19º12´04"	16º50´13"	278	19º14´27"	16º49´40"	454	*Macropodia macrocheles, Paromola cuvieri*
MU158	08/12/2008	19º15´38"	16º43´32"	80	19º12´56"	16º42´10"	98	*Calappa pelii, Homola barbata*
MU159	09/12/2008	17º37´55"	16º34´30"	224	17º41´01"	16º34´24"	229	*Macropodia macrocheles*
MU160	09/12/2008	17º38´31"	16º29´14"	143	17º41´17"	16º29´07"	147	*Macropipus rugosus*
MU161	09/12/2008	17º47´48"	16º20´46"	89	17º50´57"	16º21´16"	92	*Inachus angolensis, Macropipus rugosus, Macropodia gilsoni*
MU162	09/12/2008	17º52´50"	16º28´28"	148	17º55´53"	16º28´31"	149	*Homola barbata, Macropipus rugosus*
MU166	11/12/2008	18º09´24"	16º25´38"	87	18º12´19"	16º25´32"	85	*Inachus nanus, Macropipus rugosus, Macropodia gilsoni*
MU167	11/12/2008	18º28´10"	16º30´11"	101	18º31´12"	16º30´27"	108	*Macropipus rugosus*
MU168	12/12/2008	19º25´20"	16º52´13"	87	19º23´20"	16º53´28"	92	*Inachus angolensis, Macropipus rugosus, Macropodia gilsoni*
MU170	12/12/2008	19º30´49"	16º57´20"	102	19º33´55"	16º57´47"	92	*Macropodia gilsoni, Solenolambrus noordendei*
MU171	12/12/2008	19º35´19"	16º59´05"	105	19º38´25"	16º58´55"	100	*Monodaeus cristulatus, Solenolambrus noordendei*
MU173	13/12/2008	19º44´50"	17º11´02"	314	19º45´24"	17º12´22"	540	*Macropodia macrocheles*

Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
MU174	13/12/2008	19º50´01"	17º13´22"	85	19º52´17"	17º15´46"	84	*Inachus angolensis*
MU175	13/12/2008	19º47´30"	17º18´26"	618	19º48´07"	17º20´32"	850	*Bathynectes piperitus, Paromola cuvieri*
MU177	14/12/2008	18º48´41"	16º52´00"	584	18º51´44"	16º51´59"	580	*Bathynectes piperitus, Chaceon maritae*
MU179	16/11/2009	18º48´25"	16º45´59"	303	18º46´46"	16º45´23"	304	*Bathynectes piperitus, Macropodia macrocheles*
MU181	17/11/2009	19º11´00"	16º44´53"	142	19º12´27"	16º45´50"	148	*Macropipus rugosus*
MU182	17/11/2009	19º11´39"	16º57´03"	726	19º12´40"	16º59´52"	726	*Chaceon maritae*
MU183	18/11/2009	19º40´41"	17º04´53"	138	19º39´27"	17º03´38"	177	*Eurynome aspera, Solenolambrus noordendei*
MU184	18/11/2009	19º29´44"	17º01´19"	213	19º28´06"	17º00´43"	202	*Homola barbata, Macropipus rugosus, Macropodia macrocheles*
MU186	19/11/2009	19º35´44"	19º03´59"	174	19º34´06"	17º03´19"	174	*Homola barbata, Macropipus rugosus, Spinolambrus notialis*
MU188	19/11/2009	19º50´08"	17º25´24"	627	19º50´05"	17º22´43"	627	*Chaceon maritae, Paromola cuvieri*
MU200	25/11/2009	20º41´16"	17º41´53"	352	20º42´16"	17º40´27"	334	*Homola barbata, Inachus leptochirus*
MU204	26/11/2009	20º37´53"	17º39´26"	155	20º39´35"	17º39´01"	145	*Homola barbata, Inachus leptochirus*
MU205	27/11/2009	20º33´56"	17º33´28"	89	20º32´22"	17º36´54"	93	*Inachus angolensis, Macropipus rugosus*
MU207	29/11/2009	20º00´54"	17º32´20"	88	19º59´52"	17º33´48"	117	*Goneplax rhomboides, Inachus nanus*
MU208	29/11/2009	20º02´03"	17º32´25"	96	20º00´38"	17º31´32"	79	*Macropipus rugosus*
MU209	29/11/2009	19º57´01"	17º28´59"	115	19º55´23"	17º29´02"	150	*Eurynome aspera*
MU210	30/11/2009	19º24´53"	16º52´06"	86	19º23´10"	16º52´25"	90	*Macropodia gilsoni, Medorippe lanata, Inachus angolensis, Solenolambrus noordendei*
MU211	30/11/2009	19º21´50"	16º52´50"	92	19º21´18"	16º52´35"	109	*Pisa armata*
MU212	30/11/2009	19º19´55"	16º54´08"	163	19º18´19"	16º56´04"	200	*Inachus angolensis, Inachus nanus, Monodaeus cristulatus, Solenolambrus noordendei*
MU214	02/11/2009	17º22´35"	16º45´41"	650	17º24´29"	16º44´02"	588	*Bathynectes piperitus, Goneplax barnardi*
MU216	16/06/2009	16º06´20"	16º58´01"	422	16º08´07"	16º55´60"	422	*Goneplax barnardi*
MU217	04/12/2009	16º17´47"	16º47´36"	111	16º14´11"	16º48´17"	113	*Macropodia gilsoni*
MU219	06/12/2009	16º12´13"	16º50´28"	125	16º13´35"	16º50´01"	129	*Monodaeus cristulatus*
MU222	07/12/2009	17º13´22"	16º51´52"	729	17º16´16"	16º51´04"	723	*Bathynectes piperitus*
MU223	09/12/2009	17º48´20"	16º26´40"	116	17º46´46"	16º26´55"	117	*Homola barbata, Macropodia gilsoni*
MU224	09/12/2009	17º36´05"	16º31´52"	173	17º34´40"	16º32´23"	177	*Macropipus rugosus*
MU226	09/12/2009	16º55´55"	16º44´58"	109	16º57´43"	16º45´16"	107	*Inachus aguiarii*

Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
MU227	10/12/2009	17º48´20"	16º30´33"	183	17º50´10"	16º30´32"	181	*Goneplax rhomboides, Macropipus rugosus*
MU233	13/12/2009	18º44´26"	16º37´12"	165	18º43´50"	16º38´48"	189	*Macropodia gilsoni, Macropodia macrocheles, Solenolambrus noordendei*
MU235	14/12/2009	19º01´34"	16º41´55"	123	19º00´00"	16º42´04"	123	*Macropodia gilsoni*
MU243	20/11/2010	20º10´10"	17º42´28"	827	20º11´26"	17º45´21"	850	*Chaceon maritae*
MU251	24/11/2010	19º50´43"	17º17´14"	107	19º51´16"	17º18´46"	107	*Inachus angolensis*
MU260	29/11/2010	19º12´38"	16º43´31"	101	19º14´08"	16º44´20"	120	*Inachus angolensis*
MU261	29/11/2010	19º14´26"	16º44´14"	111	19º13´19"	16º46´02"	146	*Pisa armata, Inachus nanus*
MU263	29/11/2010	19º00´43"	16º52´26"	615	18º57´50"	16º52´52"	624	*Paromola cuvieri*
MU266	01/12/2010	17º57´46"	16º24´13"	103	17º55´56"	16º23´46"	103	*Macropipus rugosus*
MU267	02/12/2010	17º58´53"	16º39´38"	673	18º01´43"	16º38´43"	670	*Bathynectes piperitus, Chaceon maritae*
MU276	07/12/2010	16º18´56"	16º53´25"	637	16º21´53"	16º52´41"	562	*Bathynectes piperitus*
MU277	07/12/2010	16º15´19"	16º47´58"	112	16º16´55"	16º47´22"	110	*Macropodia longipes*, *Inachus aguiarii*
MU280	08/12/2010	16º33´56"	16º47´49"	230	16º34´50"	16º46´27"	239	*Macropodia macrocheles*
MU281	09/12/2010	16º53´26"	16º45´19"	100	16º51´45"	16º45´47"	106	*Homola barbata*
MU285	11/12/2010	17º27´50"	16º30´34"	128	17º29´38"	16º30´23"	132	*Macropipus rugosus*
MU290	14/12/2010	18º16´53"	16º35´23"	311	18º18´44"	16º35´35"	311	*Euchirograpsus liguricus, Monodaeus cristulatus*
MU291	14/12/2010	18º26´32"	16º29´17"	106	18º26´22"	16º31´18"	137	*Inachus angolensis, Macropipus rugosus*
MUBV01	21/11/2009	20º09´46"	17º36´52"	112	20º10´06"	17º36´51"	112	*Calappa pelii, Ethusa rugulosa, Inachus angolensis, Macropipus rugosus*, *Medorippe lanata, Pseudomyra mbizi, Solenolambrus noordendei*
MUBV02	21/11/2009	20º07´36"	17º39´36"	318	20º07´47"	17º39´42"	330	*Acanthocarpus brevispinis, Bathynectes piperitus, Ethusa rugulosa, Homola barbata, Inachus angolensis, Solenolambrus noordendi*
MUBV03	21/11/2009	20º07´04"	17º40´48"	528	20º07´18"	17º40´54"	538	*Bathynectes piperitus, Chaceon maritae, Goneplax barnardi, Paromola cuvieri*
MUBV08	26/11/2009	20º44´50"	17º38´47"	174	20º45´03"	17º38´37"	168	*Liocarcinus corrugatus, Monodaeus cristulatus*
MUBV09	27/11/2009	20º43´34"	17º45´48"	549	20º43´43"	17º45´25"	555	*Bathynectes piperitus, Goneplax barnardi*
MUBV10	27/11/2009	20º44´25"	17º40´07"	332	20º44´37"	17º40´16"	344	*Atelecyclus rotundatus, Bathybectes piperitus, Cymonomus granulatus, Ebalia nux, Ethusa rugulosa, Inachus grallator, Inachus leptochirus, Monodaeus cristulatus, Solenolambrus*

Station Code	Date	Latit N start	Long W start	Depth start (m)	Latit N turn	Long W turn	Depth turn (m)	Species
								noordendei
MUBV13	03/12/2009	16º46´23"	16º50´37"	493	16º46´31"	16º50´58"	517	*Acanthocarpus brevispinis, Bathynectes piperitus, Chaceon maritae, Goneplax barnardi*
MUBV14	03/12/2009	16º46´02"	16º47´36"	300	16º45´49"	16º47´33"	281	*Acanthocarpus brevispinis, Bathynectes piperitus, Euchirograpsus liguricus, Goneplax barnardi, Goneplax rhomboides, Incachus angolensis, Inachus grallator, Monodaeus cristulatus*
MUBV15	03/12/2009	16º46´27"	16º45´08"	148	16º46´39"	16º44´56"	135	*Calappa pellii, Inachus angolensis, Macropodia gilsoni, Pseudomyra mbizi, Pisa armata, Solenolambrus noordendei*
MUBV17	11/12/2009	18º28´37"	16º50´03"	1022	18º28´23"	16º50´01"	1026	*Ethusa rosacea*
MUBV18	11/12/2009	18º28´27"	16º42´43"	559	18º28´14"	16º42´40"	574	*Bathynectes piperitus, Goneplax barnardi*
MUBV19	11/12/2009	18º27´35"	16º38´02"	306	18º27´22"	16º37´58"	306	*Acanthocarpus brevispinis, Bathynectes piperitus, Goneplax barnardi*
MUBV20	12/12/2009	18º28´16"	16º32´37"	155	18º28´02"	16º32´32"	155	*Ethusa rugulosa*
MUBV21	23/11/2010	19º50´36"	17º17´13"	107	19º50´41"	17º17´40"	109	*Calappa pelii, Distolambrus maltzani, Ethusa rugulosa,Homola barbata, Inachus angolensis, Macropipus rugosus, Macropodia gilsoni, Medorippe lanata, Solenolambrus noordendei, Spinolambrus notialis*
MUBV22	23/11/2010	19º49´07"	17º17´25"	300	19º49´14"	17º17´47"	300	*Acanthocarpus brevispinis, Bathynectes piperitus, Macropodia macrocheles, Megalopa Paromola cuvieri*
MUBV25	24/11/2010	19º48´09"	17º17´50"	499	19º47´56"	17º17´23"	520	*Bathynectes piperitus, Goneplax barnardi*

TALASINÍDEOS

Matos-Pita, S. S. de and Ramil, F. (2015) Additions to thalassinidean fauna (Crustacea: Decapoda) off Mauritania (NW Africa) with the description of a new genus and a new species. *Zootaxa*, 4020(3): 571–587.

En este artículo se incluyen todas las especies de talasinídeos recogidos en el transcurso de las cuatro campañas *Maurit*, recolectados tanto sobre fondos blandos con el arrastre comercial como sobre la barrera de coral y los cañones con la draga de roca. En los muestreos realizados también sobre fondos blandos con bou de vara no aparecieron representantes de este grupo.

Se describe un nuevo género, *Ezaxius* S. de Matos-Pita & Ramil, 2015 y una nueva especie para la ciencia, *Ezaxius ferachevali* S. de Matos-Pita & Ramil, 2015 dentro de la familia Axiidae. Se propone también la reasignación al género *Trypaea* Dana, 1852 de la especie *Callianassa oblonga* Le Loeuff & Intes, 1974 basándonos en la ausencia de pleópodos en el segundo segmento abdominal. Además *T. oblonga* se cita por primera vez desde su descripción original, se describen sus hembras, desconocidas hasta el momento, y se amplían su área de distribución geográfica y su rango batimétrico. Además se confirma la presencia de *Calocarides coronatus* (Trybom, 1904) en la costa occidental africana ampliándose su distribución al menos hasta Mauritania, donde se cita por primera vez. Finalmente se incluyen algunas consideraciones generales acerca del actual estado de la sistemática de los talasinídeos.

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Additions to thalassinidean fauna (Crustacea: Decapoda) off Mauritania (NW Africa) with the description of a new genus and a new species

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Abstract

The Maurit surveys along the Mauritanian coast revealed the small collection of thalassinideans examined in this work. A total of four species were identified, of which *Ezaxius ferachevali* **n. gen.**, **n. sp.** is described and figured here. *Calocaris macandreae* Bell, 1853 is the most abundant species, while the presence of *Calocarides coronatus* (Trybom, 1904) is confirmed on the West African coast. *Trypaea oblonga* n. comb. is proposed for *Callianassa oblonga* Le Loeuff & Intès, 1974 and it has been recaptured for the first time since its original description, with the addition of a female specimen. We also include remarks on the current status of thalassinidean systematics.

Key words: Thalassinideans, *Calocaris*, *Calocarides*, *Trypaea*, *Ezaxius ferachevali* new genus, new species, Mauritanian waters

Introduction

Thalassinideans, known as mud lobsters and mud and ghost shrimps, are mostly reported from bottom sediments shallower than 200-m depth, but also in the deep sea (Dworschak *et al.* 2012). Thalassinideans comprise about 600 species (Dworschak 2005, Sakai 2011) and their highest species diversity is found in the Indo-West Pacific and in regions of the Southwest Atlantic (Dworschak 2005).

Recently, Sakai *et al.* (2015) compiled and updated all known findings on thalassinideans from Mauritanian waters, and also described a new genus and five new species amongst the samples collected south of Banc d'Arguin to Cape Timiris, during the MSM 16/3 PHAETON cruise onboard R/V Maria S. Merian, raising the number of known species in this area to 14.

Present work further contributes to knowledge of the thalassinidean fauna off Mauritania with the study of a small collection obtained onboard R/V Vizconde de Eza during the series of Maurit surveys carried out along the entire Mauritanian coast from Cape Blanc to the Senegalese border. The reporting of the species *Calocarides coronatus* and *Trypaea oblonga* n. comb., and the description of *Ezaxius ferachevali* **n. gen. n. sp,** bring the number of thalassinidean species now known from Mauritanian waters up to 17.

Material and methods

During the Maurit surveys carried out annually onboard the Spanish R/V Vizconde de Eza in November and December from 2007 to 2010, thalassinidean fauna was captured at 12 stations (see Fig. 1). Of these 12 stations, 10 were sampled by means of a rock dredge and two with a commercial bottom trawl (Lofoten type). Sampled depths ranged from 322 to 637 m.

Onboard, all specimens were carefully sorted from the total catch, photographed, counted, weighed and preserved in 70% ethanol for further studies in the laboratory.

Measurements provided are total length (TL), measured from the tip of the rostrum to the posterior border of the telson, and carapace length (CL), measured from the tip of the rostrum to the posterior border of carapace, following a mid-dorsal line. Symbol '+' indicates that the specimen is not complete (e.g. lacking rostrum or part of abdomen). Abbreviations used are: stn, station; MNHN, Museum National d'Histoire Naturelle (Paris, France); MNCN, Museo Nacional de Ciencias Naturales Museum (Madrid, Spain).

The holotype is deposited in the MNCN and the other species are housed in the Zoology Laboratory (BA3), Universidad de Vigo (Spain).

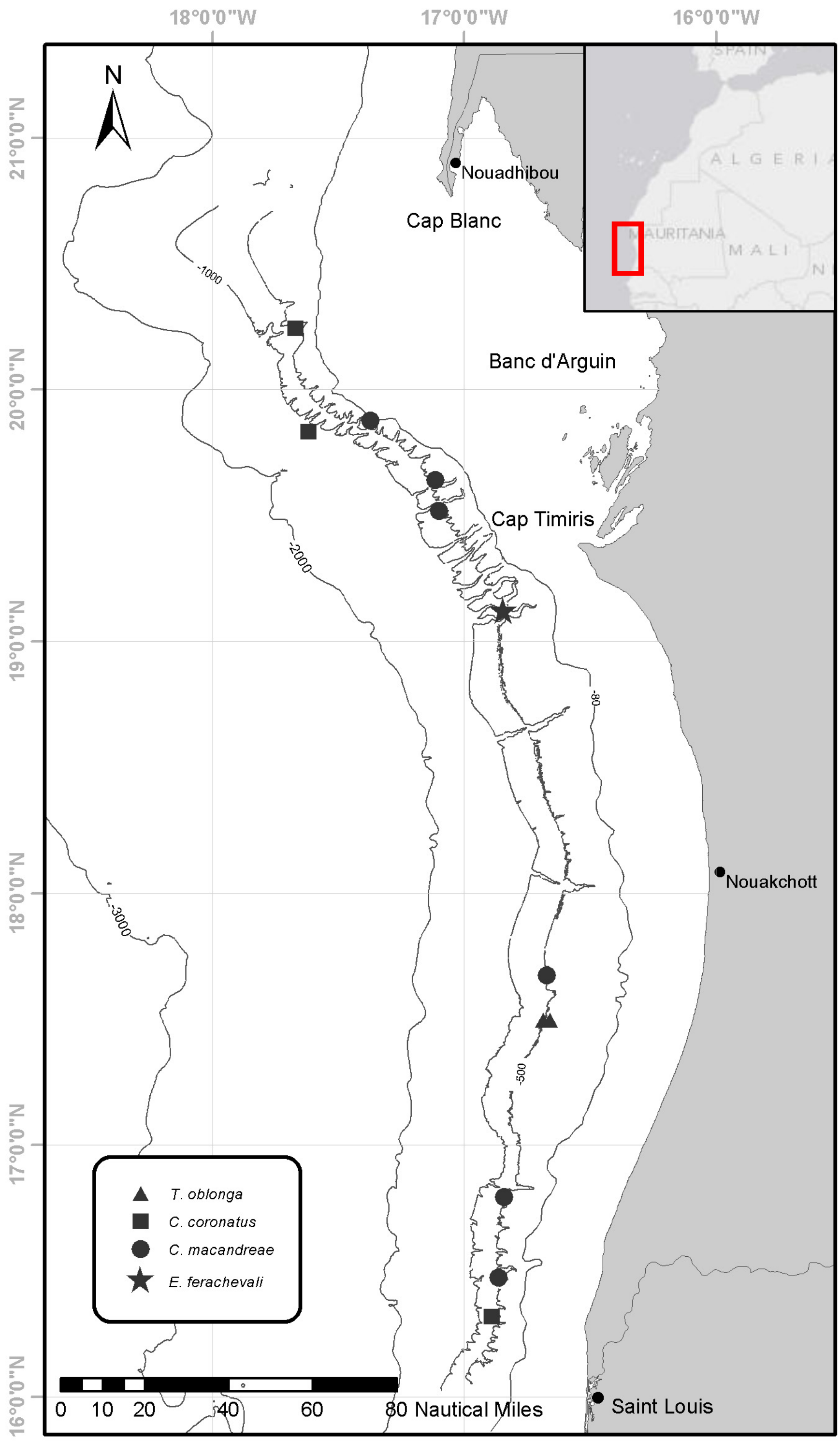

FIGURE 1. Distribution of the Maurit survey thalassinidean species: *Trypaea oblonga* (Le Loeuff & Intès, 1974) n. comb.; *Calocarides coronatus* (Trybom, 1904); *Calocaris macandreae* Bell, 1846 and *Ezaxius ferachevali* **n. gen. n. sp.**

Systematics

The higher classification of 'thalassinideans' has been at the centre of much debate. The families and/or subfamilies were summarized for the first time by Borradaile (1903), later compiled by de Man (1925, 1928) and subsequently recieved alternative classifications, mainly according to morphological and molecular characteristics. Thus, some authors recognized thalassinidean fauna as an infraorder (Thalassinidea = Thalassinacea = Thalassinida), including three superfamilies: Thalassinoidea, Callianassoidea and Axioidea (Poore 1994, Dworschak 2000, 2005, Martin & Davies 2001, Dixon *et al.* 2003, Sakai & Ohta 2005), while others recognized only two superfamilies: Callianassoidea and Axioidea (Ngoc-Ho 2003, McLaughlin *et al.* 2005) or Callianassoidea and Thalassinoidea (Sakai 2005b, Tsang *et al.* 2008); none of these proposals have grouped families by superfamily in the same way.

'Thalassinidean' families were also grouped in Axiidea and Gebiidea, which were initially considered as having the status of sections (de Saint Laurent 1979a) and were later accepted as superfamilies (de Saint Laurent 1979b, de Saint Laurent & Le Loeuff 1979, Ahyong & O'Meally 2004). Axiidea and Gebiidea were subsequently treated as two different infraorders, instead of the former single infraorder Thalassinidea (Robles *et al.* 2009, Bracken *et al.* 2009, 2010, De Grave *et al.* 2009, Ahyong *et al.* 2011, Dworschak *et al.* 2012). Two related infraorders were also suggested by Sakai and Sawada (2006), in this case named Callianassidea and Thalassinidea, respectively. After discussions about the suitability of these names, they were later accepted by Sakai & Türkay (2014). Family vs subfamily status and genera assignments to a family are still under debate in several cases, and many taxonomic revisions by Sakai (1999, 2005a, 2006 and 2011) were discussed by Dworschak (2005, 2007) and Poore (2008a), and were not incorporated in Poore (2008b: Table 1) or Dworschak *et al.* (2012).

Despite continued efforts to clarify the systematics of thalassinidean decapods, to date no common consensus has been achieved (see different systematic arrangement in the recent works by Dworschak 2013 and Sakai *et al.* 2015). Two main systematic approaches can be found in the literature: one proposed by Poore (1994) and followed by Dworschak *et al.* (2012) and the other proposed by Sakai (1999, 2005a, 2006 and 2011). Both tendencies are still under debate (Poore *et al.* 2014, Sakai 2014) and were named here 'Sakai *et al.*' and 'Dworschak *et al.*' for practical purposes; a summary can be found in Table 1.

We identified four different thalassinidean species in the Maurit surveys' collection: *Calocarides coronatus* (Trybom, 1904), *Calocaris macandreae* Bell, 1846, *Trypaea oblonga* (Le Loeuff & Intès, 1974) n. comb. and *Ezaxius ferachevali* **n. gen.**, **n sp.** The genus *Calocarides* has been consistently included in the Axiidae, in the same way that the genus *Trypaea* has been included in the Callianassidae; however, the genus *Calocaris* has been alternately placed in the families Axiidae and Calocarididae. According to "Sakai *et al.*" the two families are differentiated by the location of the appendix masculina in the pleopod 2 endopod: terminal in Calocarididae (as in *Calocaris*) and mesial in Axiidae. *Ezaxius* **n. gen.** is here referred to the family Axiidae (see remarks under the new genus). Table 2 shows the systematic arrangement of the thalassinidean species collected in the Maurit surveys, following the two main tendencies in thalassinidean systematics mentioned above.

Taxonomy

Genus *Calocarides* Wollebaek, 1908

Calocarides coronatus (Trybom, 1904)

Euconaxius coronatus Trybom, 1904: 384, Pl. 20 figs. 1–10, 13, 14, Pl. 21, figs. 1–8.
Calocarides coronatus.—Sakai & de Saint Laurent, 1989: 80 (In part, see remarks).—Sakai, 2011: 89 (references and synonymies)

Material examined. Expedition Maurit1011: Stn MU276, Mauritania, off Saint Louis (16°18′56″–16°21′53″N, 16°53′25″–16°52′41″W), 637–562 m depth, muddy fine sand, commercial trawl, 7.XII.2010; 1 male TL/CL: 35.46/12.67 mm, both right pereiopods 3 and 4 missing. Stn MUDR09, Mauritania, canyon area off Banc d'Arguin (20°14′36″N, 17°40′10″W), 525-m depth, muddy coral rubble, rock dredge, 19.XI.2010; one juvenile TL/CL: 20.14/7.39 mm, both pereiopods 1 and 3, and right pereiopod 5 missing. Stn MUDR10, Mauritania, canyon area off Banc d'Arguin (19°50′01″N, 17°37′03″W), 520-m depth, mud with coral rubble, rock dredge, 22.XI.2010; one male TL/CL: 28.28/10.27 mm, left pereiopods 1–3 missing.

TABLE 1. The two main recent tendencies in the systematic arrangement of the thalassinidean families.

Infraorder	'Sakai *et al.*' families	'Dworschak *et al.*' families	Infraorder
Thalassinidea	Laomediidae	Axianassidae[1]	Gebiidea
		Laomediidae	
	Thalassinidae	Thalassinidae	
	Upogebiidae	Upogebiidae	
Callianassidea	Axiidae	Axiidae	Axiidea
	Calocarididae[2]		
	Coralaxiidae[2]		
	Eiconaxiidae[2]		
	Eiconaxiopsididae[2]		
	Anacalliacidae[3]	Callianassidae	
	Bathycalliacidae[3]		
	Callianassidae[3]		
	Callianopsidae		
	Eucalliacidae[3]		
	Lipkecallianassidae[3]		
	Callianideidae	Callianideidae	
	Thomassiniidae[4]		
	Ctenochelidae	Ctenochelidae	
	Ctenocheloidae[5]		
	Gourretiidae[5]		
	Pseudogourretiidae[5]		
	Meticonaxiidae[6]	Micheleidae	
	Micheleidae		
	Strahlaxiidae	Strahlaxiidae	

1. Dworschak *et al.* (2012) kept this family separate, as originally designated by Schmitt (1924), although its single genus *Axianassa* was also placed in Laomediidae (Poore 1994, among others).
2. Calocarididae and Eiconaxiidae were subsumed into Axiidea, while Coralaxiidae and Eiconaxiopsididae were not mentioned by Dworschak *et al.* (2012). Corallaxiidae was erected as an axiid subfamily by Sakai and de Saint Laurent (1989) and subfamilies were not considered in Dworschak *et al.* (2012). Eiconaxiopsididae was erected by Sakai (2011) to host the new genus *Eiconaxiopsis*, including the new species *E. heinrichi* and *E. sibogae*. *Eiconaxiopsis sibogae* was previously placed in Eiconaxiidae [as *Eiconaxius sibogae* (de Man, 1925)]. Notice here that Dworschak *et al.* (2012)'s manuscript was conluded on 5 July 2010, long before Sakai's work has been published.
3. None of these families were mentioned by Dworschak *et al.* (2012) and all of them were at first described as callianassid subfamilies (Manning and Felder 1991; Sakai and Türkay 1999; Sakai 2005a).
4. Thomassiniidae was subsumed into Callianideidae by Dworschak *et al.* (2012).
5. Pseudogourretiidae was originally described as a subfamily within Gourretiidae (Sakai, 2005), but this family was subsumed into Ctenochelidae by Dworschak *et al.* (2012). Ctenocheloidae was erected by Sakai (2011: 595) for the single species *Ctenocheloides attenboroughi* Anker, 2010, which was originally placed in Ctenochelidae. Posteriorly, Komai (2013) described a new *Ctenocheloides* species, *C. nomurai*, but the author keep the genus in the family Ctenochelidae.
6. Meticonaxiidae was described as a subfamily under Callianideidae (Sakai, 1992a) but was later transferred to Micheleidae (Poore, 1994).

TABLE 2. Thalassinidean species of the Maurit surveys arranged following the two main systematic tendencies in the group.

Infraorder	Family ('Sakai *et al.*')	Maurit surveys thalassinidean species	Family ('Dworschak *et al.*')	Infraorder
Callianassidea	Axiidae	*Calocarides coronatus* (Trybom, 1904)	Axiidae	Axiidea
		Ezaxius ferachevali **n. gen. n. sp.**		
	Calocarididae	*Calocaris macandreae* Bell, 1846		
	Callianassidae	*Trypaea oblonga* (Le Loeuff & Intès, 1974) n. comb.	Callianassidae	

Habitat. *Calocarides coronatus* is previously reported living on bottoms of 'shell remains Foram.' (García Raso 1996) and soft mud, at depths between 162 and 1200 m (Cartes *et al.* 1994; d'Udekem d'Acoz 1999; Ngoc-Ho 2003). Our specimens were sampled on muddy fine sand and muddy coral rubble, at depths from 562 to 637 m.

Distribution. East Atlantic, from the north of Europe to tropical West Africa (at least to Mauritania; present work, see remarks) and the Mediterranean Sea (Sakai & de Saint Laurent 1989; Ngoc-Ho 2003).

Remarks. *Calocarides coronatus* has been found evenly distributed in the north of Europe (Norway, Sweden, Denmark, North Sea) but is not reported from the British Isles (Ngoc-Ho 2003). The same author corroborated the inclusion in this species of the small Mediterranean specimens reported by Cartes *et al.* (1994, Catalan Sea) and García Raso (1996, Alboran Sea), and also noted that the species was not recorded from South European Atlantic coasts. Ngoc-Ho (2003) also considered as doubtful the assignment to *C. coronatus* (for 'geographical reasons', Sakai and de Saint Laurent, 1989: 79) of the material previously identified as *Calocarides longispinis* (McArdle, 1901) by Stebbing (1910: 368; as *Calastacus longispinis*) from South Africa and by Macpherson (1983: 45, as *Calastacus longispinis*; in part, see below) from Namibia.

Material from Table Mountain named as *Calastacus longispinis* [not *C. longispinis* McArdle, 1901= *Calocarides longispinis* (McArdle, 1901)] by Stebbing (1910: 368), reported and figured later by Barnard [1950: 503, fig. 93 d-f; as *Calocaris (Calastacus) longispinis*] and also listed by Kensley (1981: 30; as *Calocaris longispinis*), was described as the new species *Calocarides capensis* by Kensley (1996). Namibian material (20°–21°S) identified as *Calastacus longispinis* by Macpherson (1983: 45) was also described as the new species *Calocarides macphersoni* by Kensley (1996). Material sampled in South Namibia [26°S; Macpherson 1983: 45 as *Calastacus longispinis* (McArdle, 1901)], and included in *Calocarides coronatus* by Sakai & de Saint Laurent (1989: 80), was subsequently transferred to *Calocarides capensis* by Sakai (2011: 88).

Other *C. coronatus* material from the MNHN checked by Sakai & de Saint Laurent (1989) from Portugal and tropical West Africa is unfortunately missing from the MNHN collection (MNHN Direction des Collections-Invertébrés; personal communication) and, although the authors included some figures (Sakai & de Saint Laurent 1989: figs. 20A–D) of one of the African specimens, which can be attributed to *C. coronatus*, neither detailed description nor exact African locality were provided.

Our specimens concur with the descriptions, diagnosis and figures of *Calocarides coronatus* supplied by Trybom (1904), Kensley (1996) and Ngoc-Ho (2003). Some minor differences mainly concerning the relative length of the antennal acicle with regard to antennal peduncle and pereiopod 1 meri spinulation can be explained by differences in size, even among our specimens. Moreover, our specimens confirm the presence of *C. coronatus* in tropical West Africa and are the first ever recorded in Mauritanian waters.

Genus *Calocaris* Bell, 1853

Calocaris macandreae Bell, 1846

Calocaris Macandreae Bell, 1846: 233, four unnumbered figures.

Calocaris macandreae.—Ngoc-Ho, 2003: 459, figs. 6, 7.—Sakai, 2011: 233, figs. 45–47 (lit. and syn.).—Sakai & Türkay, 2012: 729 (North Sea, 133 m; Mediterranean, from 45.1 to 1253–1278-m depth); 2014: 160 (Denmark, 418 and 420-m depth).—Sakai *et al.*, 2015: 3 (off Mauritania, 483 to 545-m depth).

Calocaris (*Calocaris*) *barnardi*.—Barnard, 1950: 503, figs. 93, i–k.

Calocaris barnardi.—Macpherson, 1983: 42, figs. 25,b–d.

Material examined. Expedition Maurit0911: Stn. MUDR06, off Mauritania (17°40´22″N, 16°40´11″W) on cold-water coral reef, 435-m depth, mud with coral rubble, rock dredge, 10.XII.2009; two hermaphrodites, TL/CL: 28.46/10.08 mm (both pereiopod 1, left pereiopod 3 and right pereiopod 4 missing) and TL/CL: +23.86/+10.25 mm (half rostrum, all pereiopods missing, abdomen detached). Expedition Maurit1011: Stn. MUDR11, canyon area off Banc d'Arguin, Mauritania (19°38´25″N, 17°06´52″W), 322-m depth, rock, rock dredge, 26.XI.2010; one hermaphrodite, TL/CL: 26.38/9.46 mm, both pereiopod 1, left pereiopod 3 and right pereiopod 4 missing. Stn. MUDR12, canyon area off Banc d'Arguin, Mauritania (19°52´38″N, 17°22´23″W), 485-m depth, muddy coral rubble and shell debris, rock dredge, 26.XI.2010; four hermaphrodites, TL/CL: +31.02/+9.84 mm (rostrum and left pereiopods 2 and 5 missing, telson damaged), TL/CL: 14.56/8.99 mm (right pereiopod 1, pereiopod 4 and pereiopod 5 missing), TL/CL: 34.06/12.35 mm (ovigerous; both pereiopod 1 missing) and TL/CL: 32.62/11.95 mm (ovigerous; left pereiopods 1, 3 and 4, and right pereiopod 4 missing, carapace and left uropod damaged). Stn. MUDR16, canyon area off Banc d'Arguin, Mauritania (19°30´59″N, 17°05´54″W), 474-m depth, muddy coral rubble and shell debris, rock dredge, 27.XI.2010; two hermaphrodites, TL/CL: 24.18/8.50 mm (left pereiopod 3 and right pereiopod 1 missing) and TL/CL: 27.43/9.97 mm (left pereiopods 3 and 4, and right pereiopods 1, 4 and 5 missing, left pereiopod 1 detached). Stn. MUDR21, off Mauritania (16°28´13″N, 16°51´43″W) on cold-water coral reef, 522-m depth, muddy coral rubble, rock dredge, 9.XII.2010; one hermaphrodite, TL/CL: 28.41/11.14 mm (left pereiopods 3, 4 and 5, and right, pereiopod 3 missing). Stn. MUDR22, off Mauritania (16°47´30″N, 16°50´28″W) on cold-water coral reef, 460-m depth, muddy coral rubble, rock dredge, 9.XII.2010; three hermaphrodites, TL/CL: 28.86/10.88 mm (all pereiopods missing except right pereiopod 1, abdomen damaged), TL/CL: +24.68/+8.67 mm (half rostrum, all pereiopods missing except right pereiopods 2 and 5, specimen broken in two fragments) and TL/CL: 39.45/10.46 mm (ovigerous, left pereiopods 2–4 and right pereiopods 1–4 missing.

Habitat. This species has been reported on bottoms of shell debris (García Raso 1996), mud, mud with amphipod tubes, bioturbated mud, mud with cold-water coral debris (mainly *Lophelia pertusa* and *Madrepora oculata*) (d'Udekem d'Acoz 1999; Sakai *et al.* 2015), at depths of 13 to 1432 m (Dworschak 2000). Our specimens were all captured in muddy coral rubble, at depths between 322 and 522 m.

Distribution. East Atlantic from Iceland and Norway southwards to South Africa, including Mediterranean Sea (Ngoc-Ho 2003; Sakai 2011). Previously reported from Mauritanian waters by Sakai & de Saint Laurent (1989) and Sakai *et al.* (2015).

Remarks. This species has been reported off Mauritania at 587 to 600 m (Sakai & de Saint Laurent 1989) and between 483 and 545 m (Sakai *et al.* 2015), which concurs with our findings. Along the West African coast, this species has also been reported slightly deeper at 719–724-m depth off Morocco (García Raso 1996), at 300 and 380-m depth off Namibia (Macpherson 1983 as *Calocaris barnardi*) and shallower at 84 and 162-m depth off the South African Atlantic coast (Barnard 1950 as *Calocaris* (*Calocaris*) *barnardi*).

Genus *Trypaea* Dana, 1852

Trypaea oblonga (Le Loeuff & Intès, 1974) n. comb.

(Figs. 2A–D)

Callianassa oblonga Le Loeuff & Intès, 1974: 38, figs. 9a–r.—Saint Laurent & Le Loeuff, 1979: 55.—Sakai, 1999: 18; 2005a: 32, figs. 2E, 3E, 4E.
Cheramus oblongus.—Manning & Felder, 1991: 780.—Tudge *et al.*, 2000: 145.—Sakai, 2011: 369.

Material examined. Expedition Maurit0911: Stn. MU215, off S Nouakchott (Mauritania) (17°29´44″–17°28´06″N ; 16°39´31″–16°40´10″W), 358–364-m depth, muddy fine sand, commercial trawl, 2.II.2009; one male TL/CL: 19.09/4.52 mm, both pereiopods 1 missing, left P4 merus to dactylus detached and both pleopods 3 missing. Expedition Maurit1011: Stn. MUDR26, off S Nouakchott (Mauritania) cold-water coral reef (17°29´42″N, 16°41´04″W), 441-m depth, mud with coral rubble and shell debris, rock dredge, 12.XII.2010; one incomplete female, TL/CL: +12.23/4.94 mm, right pereiopod 1 carpus and chela, both pereiopods 3–5, abdominal segments 3–5 and telson are all missing.

Description. Our male specimen mostly corresponds to the type description provided by Le Loeuff & Intès (1974). Both specimens present a rudimentary, uniramous and bisegmented pleopod 1 (as shown in Le Loeuff & Intès 1974: fig. 9r). While the type specimen was described with pleopods 2–5 missing, in our male specimen, although no scar or trace of pleopods can be appreciated on pleomere 2, a conspicuous scar is present in place of pleopod 3; pleopods 4 and 5 are biramous and foliaceous (Fig. 2A), with an appendix interna projecting from the distal proximal third of the endopod inner border, and with distal margin obliquely truncate and furnished with hooks (Figs. 2A, B).

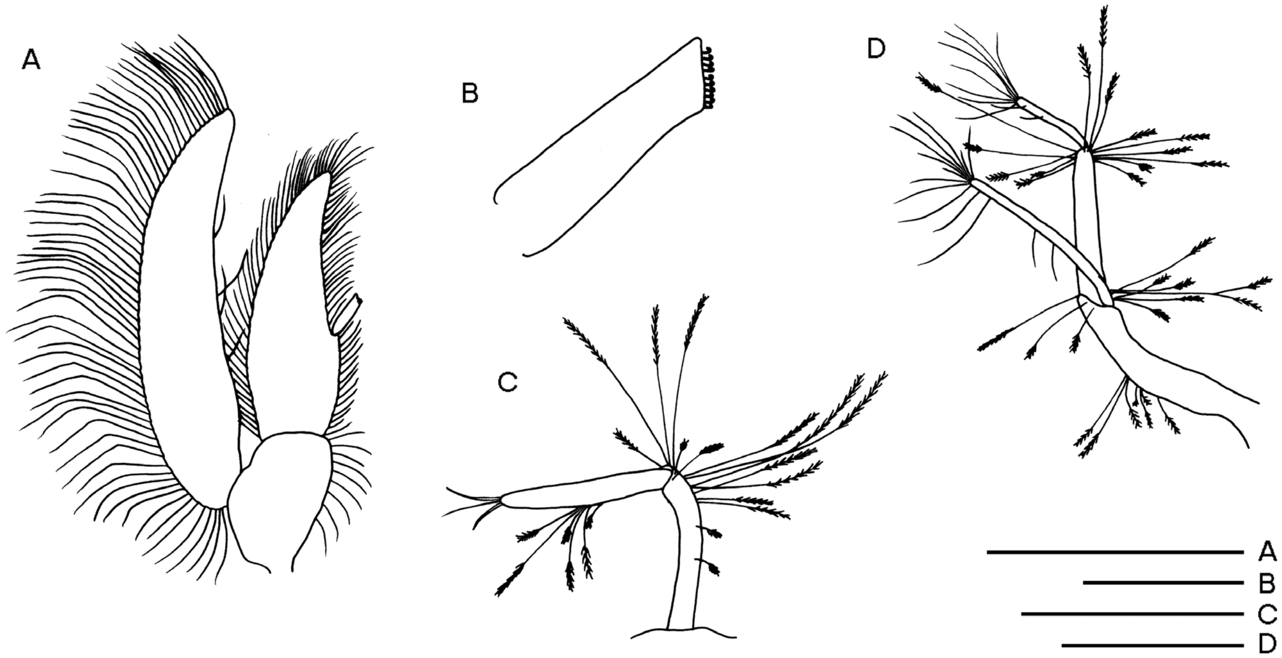

FIGURE 2. *Trypaea oblonga* (Le Loeuff & Intès, 1974) n. comb. Male MU215: A) Left pleopod 4; B) Left pleopod 4 appendix interna detail. Female MUDR26: C) Left pleopod 1; D) Left pleopod 2, mesial view. Scale bars: A, 2 mm; B, 0.2 mm; C, D, 1 mm.

Our incomplete female specimen also corresponds to the original description. Differences observed are those referring to the sex: conspicuous gonopore on both pereiopod 3 coxa, pleopod 1 uniramous and bisegmented (Fig. 2C), and pleopod 2 slender, biramous, with endopod bearing a terminal appendix interna (Fig. 2D).

Habitat. The type specimen was collected at 200 m with a DRB: drague à dents (72×30 cm); no bottom was specified (Le Loeuff & Intès 1974). Our specimens were captured off South Nouakchott, at two geographically close stations, on muddy fine sand and muddy coral rubble, at depths between 358–364 and 441 m.

Distribution. Previously reported only from the type locality (Ivory Coast) and now from Mauritania, this species seems to be restricted to the West African tropical region.

Remarks. To date, the type specimen (male CL: 3.5 mm) from Ivory Coast (200 m) is the only one ever recorded. After its original description as *Callianassa oblonga*, the species was included in the genus *Cheramus* Bate, 1888 as *C. oblongus* by Manning & Felder (1991), and accepted by Tudge *et al.* (2000) in this genus. However, Sakai (2005: 20) was unable to find enough morphological characters that reliably separated both genera; he therefore synonymized the genus *Cheramus* with *Callianassa*.

On the other hand, a tendency to group *Callianassa* species based on pleopod morphology, among other characters, led Saint Laurent and Le Loeuff (1979: 55) to recognize three groups: one including species with pleopod 1, but not pleopod 2; a second group of species lacking either pleopod 1 or pleopod 2; and a third group with 'des pléopodes présents, bien que faiblement développés, sur les deux premiers segments abdominaux du mâle' (pleopods on male absominal segments 1 and 2 present, although reduced). These authors included only one species, *Callianassa oblonga*, in the last group, although this species was originally described as with 'pléopode 1 réduit, en forme de doigt de gant à extrémité courbe; les autres pléopodes manquent.' (pleopod 1 reduced, finger-like and with tip curved; pleopods 2–5 absent) (Le Loeuff and Intès 1974: 40); however, although a reduced pleopod 1 is present (and bisegmented as shown in Le Loeuff and Intès (1974): fig. 9r), there is no clear evidence of an existing pleopod 2.

In his synopsis of the family Callianassidae, Sakai (1999) first associated *C. oblonga* with *Callianassa* species without pleopod 2 (Sakai 1999: 5). However, in his account of the species (Sakai 1999: 18), he described it as having male pleopods 1 and 2, as did Saint Laurent and Le Loeuff (1979). Some years later, with the revision of the Callianassoidea of the world, Sakai (2005a) arranged the *Callianassa* species into four groups according to the morphology of pleopods 1 and 2, including *C. oblonga* within the group with uniramous and two-segmented pleopod l, and with pleopod 2 absent (Sakai 2005: 25, 32). The same author (Sakai 2011: 355) later considered the morphology of male pleopods 1 and 2 as the single valid character for callianassid genera classification, redescribing, among others, the genera *Callianassa* (to include species with male pleopod 1 uniramous and bisegmented, and with male pleopod 2 uniramous, in which the protopod rarely protruded short distolaterally), *Trypaea* (male pleopod 1 uniramous, uni-, bi- or trisegmented, and male pleopod 2 absent), and *Cheramus* (male pleopod 1 absent, or uniramous and bisegmented, and with slender, biramous male pleopod 2), and subsequently, returning *Callianassa oblonga* to the genus *Cheramus* (as *Cheramus oblongus*).

All the foregoing propositions of classification were based on pleopod morphology. However, neither of the only two males ever recorded (the type specimen and the one captured during the Maurit surveys) displayed pleopod 2, and there is no evidence of their existence (at least in our material). In consequence, we propose here the relocation of *C. oblonga* to the genus *Trypaea* as *Trypaea oblonga* (Le Loeuff & Intès, 1974) n. comb.

Genus *Ezaxius* n. gen.

Diagnosis. Carapace faintly pitted. Rostrum triangular with upturned tip, laterally spinose, extending posteriorly as lateral carinae. Gastric region elevated, bearing 5 carinae: median, submedian and short lateral; submedian carinae converging anteriorly to form a horseshoe-like shape. No linea thalassinica. Cervical groove distinct only on dorsal surface, postcervical carina wide and short, weakly visible only over posterior median lobe. Eyes short, unpigmented, one-third rostrum length. Antennal acicle elongate, protruding straight forward. Anterolateral margin broadly rounded, unarmed. Maxilla 2 exopod posterior lobe with one long seta. Maxillipeds 1–3 with exopod and single epipod; maxilliped 2 with single podobranchia; maxilliped 3 with double podobranchia and single arthrobranchia. Pereiopods 1 and 2 chelate, pereiopods 1–4 with single epipod and double arthrobranchia, pereiopods 1–3 with double podobranchia. Pleurobranchia absent. Pleomeres unarmed; first somite with pleura acute; second broad, anteriorly and posteriorly rounded; 3–5 anteriorly rounded, declining to a rounded angle posteriorly; pleura on somite 6 rounded. Pleopod 1 uniramous, unsegmented; pleopods 2–5 alike, slender, with appendix interna; pleopod 2 without appendix masculina. Uropod exopod with spinose transverse suture. Telson longer than wide, with posterior margin rounded, without posteromedian tooth. Hermaphrodite.

Type species. *Ezaxius ferachevali* new species, by present designation.

Etymology. Generic name is a combination of the name *Eza* from the Spanish R/V Vizconde de Eza, on which the Maurit surveys were conducted, and the genus name *Axius*. Gender masculine.

Remarks. *Ezaxius* **n. gen.**, described here with pereiopod 2 chelate, should be included in the infraorder Axiidea/Callianassidea (see Table 1). Within this infraorder, the following combination of characters separates the new genus from all except the Axiidae and related families (see Table 1): the absence of linea thalassinica, the presence of a conspicuous rostrum and the presence of a long seta on maxilla 2 exopod posterior lobe. The presence of a uropodal exopod transverse suture, epipods on pereiopods 1–4 and an appendix masculina attached mesially on pleopod 2 endopod exclude the new genus from 'Sakai *et al.*' families Eiconaxiidae and Eiconaxiopsididae (both without uropodal suture), Coralaxiidae (lacking epipods on pereiopods 1–4) and from Calocarididae (in which the appendix masculina is attached terminally). Therefore, we subsume *Ezaxius* **n. gen.** to the family Axiidea.

Since the first attempt to identify valuable characters to define axiid genera by Kensley & Gore (1981: Table 1), the various authors have grouped the species mainly based on the morphology of the rostrum, length ratio rostrum/eyestalk, carapace carinae, antennal acicle, maxilliped 3, symmetry of the chelipeds, pleonal pleura, telson and uropods, as well as on the presence or absence of maxilla 2 posterior lobe long setae, epipods, exopods, branchiae, pleopods 1 and 2, appendix masculina, appendix interna and/or uropodal exopod transverse suture (e.g. Poore 1994; Ngoc-Ho 2003; Sakai 2011).

Some of these characters must be taken with caution because they have been demonstrated to be ambivalent. Thus, although lateral and median carapace carinae is usually constant, the submedian carina can be poorly defined or blurred in different specimens of the same species, such as in *Calaxius pitatucensis* (de Man, 1925) (see Sakai 2011: 104; as *Colemanaxius pitatucensis*), in *Allaxius aethiopicus* (Nobili, 1904) and in *Axiopsis serratifrons* (A. Milne-Edwards, 1873) (see Sakai 2011: 41, 56, respectively); moreover, postcervical carina can be posteriorly distinct in larger specimens but indistinct in smaller mature specimens, such as in *Eutrichocheles modestus* (Herbst, 1796) (see Sakai 2011: 112). The presence or absence of pleopod 1 can also be confusing, mainly in species descriptions based on only one specimen, because of the absence of this appendage in young specimens of some species, such as *Paraxiopsis brocki* (de Man, 1888), in which pleopod 1 is a segmented flagellum in large ovigerous females but lacking in small females (Sakai 1992b: 216). Variations in the armature of several body structures, including rostrum, gastric submedian carinae, telson, third maxilliped, chelipeds, second pereiopods, uropods and the length of the scaphocerite, were also observed between holotype and paratype specimens of *Formosaxius dorsum* Komai, Lin & Chan, 2010 by Komai *et al.* (2010: 3).

Our material does not share all the foregoing characters with the 19 axiid genera cited by Poore (1994), with the updated 21 axiid genera listed by Komai & Tachikawa (2007), with the 44 genera included in the Axiidae by Sakai (2011), or with the features of the axiid genus *Formosaxius* Komai, Lin & Chan, 2010. A triangular rostrum with lateral teeth continuous with lateral carinae, the presence of five gastric anterior carinae, the elongate antennal acicle, pleopods 3–5 endopods with appendix interna and the presence of a transverse suture on uropodal exopod link *Ezaxius* **n. gen.** with *Albatrossaxius* Sakai, 2011, *Axiorygma* Kensley & Simmons, 1988, *Balssaxius* Sakai, 2011, *Guyanacaris* Sakai, 2011 and *Leonardaxius* Sakai, 2011. However, all of them present a conspicuous posteromedian tooth on telson (vs no tooth in *Ezaxius* **n. gen.)** and none of them was described as being hermaphrodite. Moreover, *Ezaxius* **n. gen.** can be separated from *Albatrossaxius*, *Guyanacaris* and *Leonardaxius* by the presence of appendix masculina (vs absent in our specimen); from *Balssaxius* by the cervical groove distinct along the entire length (vs dorsally but not fully laterally distinct) and from *Axiorygma* by the absence of postcervical carina and pleopod 1 (vs presence). Therefore, while generic definitions in this family continue to be unclear or vague (Kensley & Simmons 1988; Poore 1994; see above), we describe *Ezaxius* **n. gen.** here in order to accommodate the new species *Ezaxius ferachevali* **n. sp.**

Ezaxius ferachevali **n. sp.**

(Figs. 2A, B, 3A–M)

Type material. Holotype, MNCN 20.04/10091 hermaphrodite, TL/CL: 23.60/8.80 mm (right pereiopod 1 and left pereiopod 5 are missing, both pereiopod 4 detached), Expedition Maurit 0911, Stn MUDR08, 19°07′20″N, 16°50′31″W, 470 m, 13 November 2009; canyon area off Cape Timiris (Mauritania); muddy coral rubble and shell debris, rock dredge.

Description. Carapace faintly pitted, laterally compressed, dorsally rounded; cervical groove distinct dorsally, visible laterally only over one-fourth of the distance to anterolateral margin; no discernible linea thalassinica; anterior margin with outer orbital angle rounded, evenly sloping posteriorly to a rounded anterolateral margin (Figs. 3A, 4B). Carapace ending midposteriorly as a median lobe separate from produced posterolateral margins; median lobe with a weak short, wide dorsal carina (Figs. 3B, 4A).

Rostrum triangular, as long as the antennular peduncle and with an upturned terminal tooth; slightly depressed below the level of gastric area; dorsal surface concave; lateral margins shortly produced posteriorly into gastric region as sharp ridges and armed with four pairs of symmetrically arranged teeth, five cut off and three regenerating, the third pair supraocular, the fourth on the short lateral carinae on anterior gastric region (Figs. 3A–B, 4A–B). Bristle setae are located between the rostral teeth.

Gastric region with median, submedian and lateral carinae; median smooth carina, thin in base of rostrum and wide in the middle of the gastric region, barely distinguishable near the cervical groove; submedian smooth carinae in the anterior gastric region, curving anteriorly to touch each other, forming a deep inverted U-shaped area slightly elevated from rostrum, each submedian carina bearing weakly defined and elevated indentation medially; lateral carinae short, with one tooth (posterior to the supraocular) and one posterior obscure tubercle each (Figs. 3B, 4A).

Eyes short, truncated distally and slightly angled anteroventrally, fused with carapace; cornea unpigmented (Figs. 3B, 4B). Antennular peduncle unarmed, reaching to rostral tip; length of article 1 twice that of articles 2 and 3 combined; article 3 about as long as article 2 (Fig. 5L). Antennal peduncle overreaching the antennular peduncle by the total length of the ultimate article; article 1 with ventral and lateral teeth; article 2 dorsodistally elongate forming a tooth-like tubular prolongation that reaches to the distal third of article 4, and with an acutely triangular ventral prolongation (Fig. 5M); antennal acicle unarmed, protruded straight forward and with the same shape and length of the dorsodistal tooth of article 2; article 3 with a pronounced ventrodistal tooth; article 4 about twice as long as article 5; antennal flagellum as long as the carapace (rostrum included). Maxilla 2 exopod posterior lobe (scaphognathite) with one long seta extending into branchial chamber. Maxilliped 3 pediform (ischium-merus length more than three times the merus width); coxa with a ventrodistal spine; ischium about twice as long as broad, inner crest with 11–12 similar denticles; merus about as long as ischium, armed with two sharp teeth subdistally on ventral margin, the distal-most more developed; carpus broadened distally, about half length of merus and about as long as propodus; dactylus about two-thirds the length of propodus; ischium, merus, carpus, propodus and dactylus ventral margin bearing pectinate setae obscured by simple setae; multiarticulate exopod hardly reaching proximal third of endopod carpus (Fig. 5F).

Left pereiopod 1 coxa armed with a distoventral spine. Basis unarmed. Ischium with 3 irregularly spaced denticles on ventral margin. Merus about twice as long as the maximum broad, armed with a subterminal tooth on dorsal margin and with 4 sharp teeth increasing in size distally on ventral margin, a few setae on distoventral and dorsal margins. Carpus dorsal length about half length of merus, unarmed, scattered groups of setae on dorsal margin and lateral surface. Chela about 2.5 times as long as broad, with tufts of setae mostly arranged longitudinally on the lateral surface, more abundant on dactylus; dorsal and ventral margins also furnished with tufts of setae (Fig. 5G). Palm slightly longer than wide; lateral surface with a subventral crest strongly demarcate proximally, with teeth joined at base and saw-like, becoming less evident in the fixed finger; three irregular subterminal teeth below articulation with dactylus; mesial surface with two subventral tubercles distally, and five subdorsal, regularly spaced and decreasing in size (the distal subterminal, the second cut off). Propodus cutting edge with eight teeth in the proximal three-fourths decreasing in size distally, lateral surface with dentate carina on ventral margin, mesial surface with three median proximal teeth. Dactylus longer than palm, lateral surface with a median carina proximally, cutting edge armed with a proximal blunt tooth followed by a concave gap and five other blunt teeth decreasing in size distally. Distal fourth of both propodus cutting edge and dactylus are unarmed and crossing when chela is closed. Right pereiopod 1 is missing.

Pereiopod 2 chelate, unarmed except by two dorsal spines on coxa, the distal one more acute, inner margins of the chelae furnished with spiniform setae; carpus about half length of merus, and about two-thirds as long as the chela; fingers slightly longer than the palm; dense row of long setae on propodus and carpus lower margins, some scarce setae distally on merus lower margins, tufts of setae on dactylus, propodus and carpus dorsal margins (Fig. 5H).

Pereiopod 3 simple, unarmed except for two dorsomesial spines on coxa; coxae with genital pore; carpus about half length of merus and slightly longer than propodus; propodus elongate, about four times longer than wide, furnished with seven stout spiniform setae on ventrolateral margin, and sparse tufts of long setae on dorsal and ventral margins; dactylus tip corneus, with two short and stout spiniform setae on lateral surface and tufts of setae on dorsal and ventral margins.

Pereiopod 4 simple, unarmed except for one dorsomesial short blunt spine on a short and cylindrical coxa; carpus about half length of merus and two-thirds as long as propodus (Fig. 5I); propodus elongate, ventrolateral margin with a longitudinal row of 7–8 stout spiniform setae, some of which accompanied by a supplementary spiniform seta as an interrupted second longitudinal row (Fig. 5J), ventrodistally furnished with pectinate setae (Fig. 5K), some sparse tufts of simple setae along dorsal margins and some single setae along ventral margin; dactylus corneus tipped and with four short, stout spiniform setae on lateral surface decreasing proximally in size (Fig. 5J), some tufts of simple setae on dorsal and ventral margins.

Right pereiopod 5 unarmed, with scattered tufts of setae on dorsal margins and lateral surfaces; coxa ventrodistally produced, with genital opening; carpus slightly longer than half of merus and as long as half of propodus; propodus mesial surface with an oblique row of pectinate setae in the distal two-fifths, ventrodistal margin produced; dactylus corneus tipped and one-fifth of propodus length. Left pereiopod 5 is missing.

Exopod on maxillipeds 1–3; single epipod on maxillipeds 1–3 and pereiopods 1–4. Single podobranchia on maxilliped 2, and double on maxilliped 3 and pereiopods 1–3; single arthrobranchia on maxilliped 3 and double on pereiopods 1–4; pleurobranchia absent.

FIGURE 3. *Ezaxius ferachevali* **n. gen. n. sp.**, holotype: A) Entire animal, left view; B) Carapace, dorsal view. Scale bars: A, 5 mm; B, 1 mm

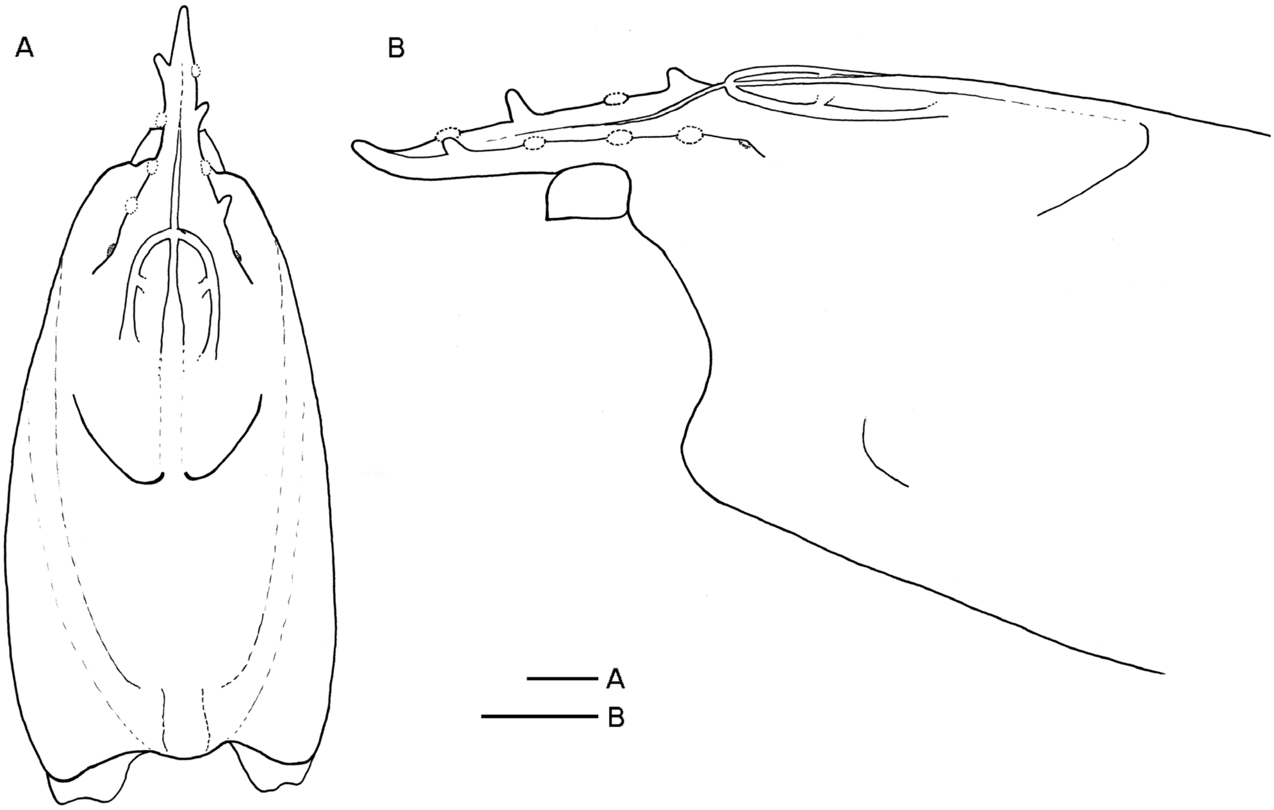

FIGURE 4. *Ezaxius ferachevali* **n. gen. n. sp.**, holotype: A) Carapace, dorsal view, setae removed; B) Anterior carapace, lateral view, setae removed. Scale bars: A, B, 1 mm.

Pleomeres smooth, unarmed and with sparse setae either single or coupled; mid-dorsal length of somites 2–6 subequal, slightly decreasing distally; weakly developed carina between terga and pleura on somites 2–5; somite 1 slightly longer than half of dorsal length of the second somite and with pleura acutely angled posteroventrally; pleura on somite 2 the widest, ventrally truncated, broadly rounded on lateroanterior and lateroposterior margins; pleura lateroanterior margin on somites 3–5 broadly rounded, declining backward to a rounded angle at lateroposterior margin; pleura on somite 6 rounded (Fig. 5A).

Pleopod 1 uniramous, unsegmented and distally spatulate (Fig. 5D); pleopods 2–5 alike, slender, biramous, endopods with appendix interna in their proximal third (Fig. 5C); pleopod 2 without appendix masculina (Fig. 5E).

Uropod exopod outer margin with submarginal ventral spinules barely visible dorsally in the distal third, movable tooth at posterodistal angle, just at the beginning of a clearly defined transverse suture dorsally furnished with 9–10 spinules; unarmed dorsal longitudinal midrib. Uropod endopod ovate, outer lateral margin with subventral spinules visible dorsally in the distal third and one distal apparent tooth; dorsal midrib with distal subterminal spine (Fig. 5B).

Telson about twice as long as wide, slightly convergent toward a rounded posterior margin without median spine; lateral margin bearing proximal lobe with spine, followed distally by two teeth each accompanied by a movable spine; half anterior dorsal surface with two short divergent carinae ending in a spine; scattered tufts of setae on dorsal surface (Fig. 5A).

Reproductive strategy. Hermaphrodite, our specimen shows clear male and female genital openings but no appendix masculina. No further details are available.

Remarks. The present species closely resembles *Eiconaxius borradailei* Bouvier, 1905, especially because of the unarmed submedian horseshoe-shaped carinae on the anterior gastric region, the strongly protruded prolongation of the second antennal peduncle and the morphology of the pleomere pleurae (see Bouvier 1925: Pl. 7: figs. 8, 7 and Pl. 9: fig. 4, respectively). The genus *Eiconaxius* was described as having a weak median carina only on the rostrum, with submedian carinae converging anteriorly to join the median carina (Poore & Collins 2009). However, *E. borradailei* was described by Bouvier (1925: 465, Pl. 7, fig 8, Pl. 9, fig. 4) with a rostral median carina extending away from the union of submedian carinae and thickening until barely discernible before

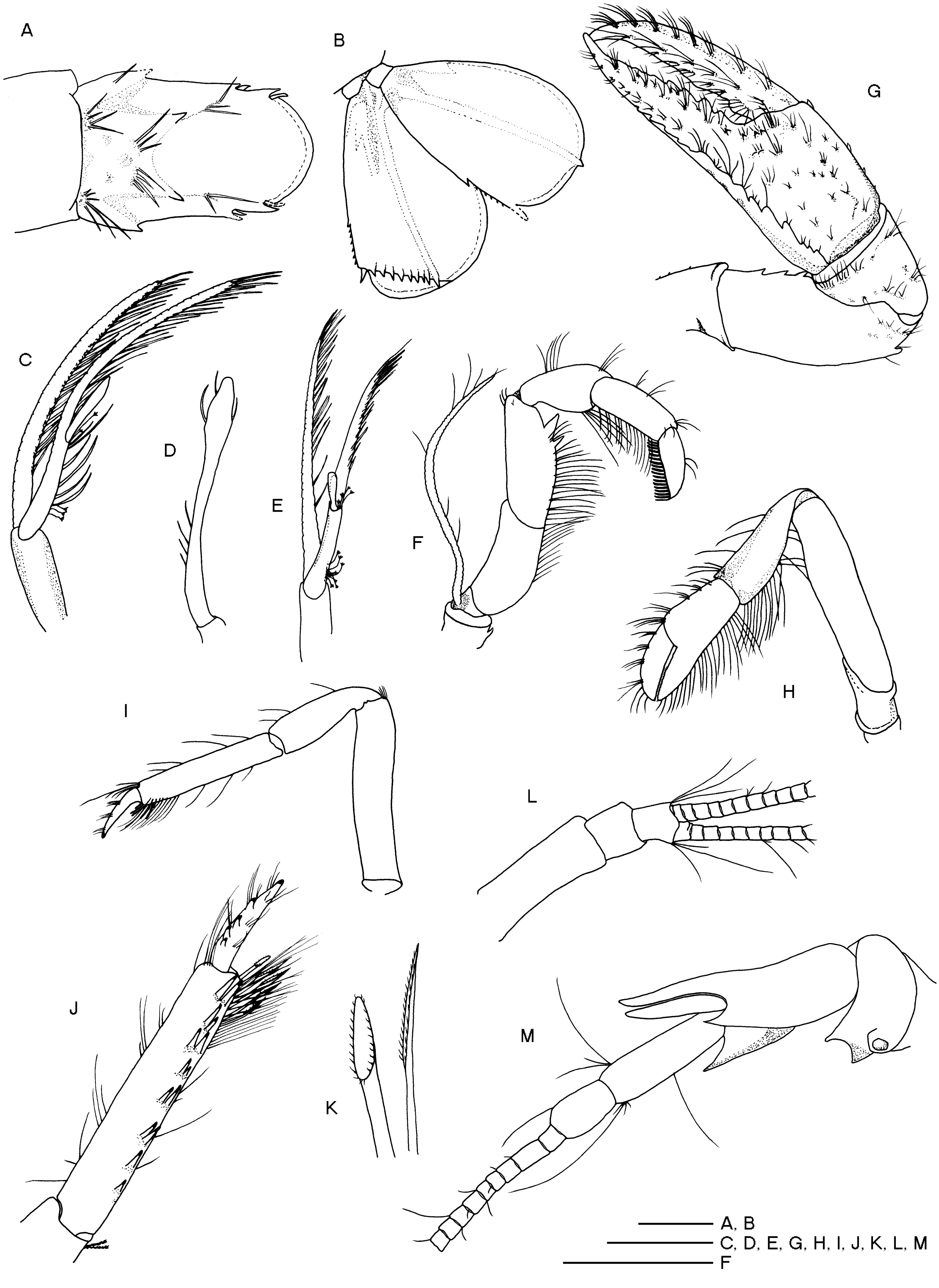

FIGURE 5. *Ezaxius ferachevali* **n. gen. n. sp.**, holotype: A) Telson, dorsal view; B) Left uropod, dorsal view; C) Pleopod 3 left; D) Pleopod 1 left, mesial view; E) Pleopod 2 left, mesial view; F) Maxilliped 3 right, lateral view; G) Pereiopod 1 left, lateral view; H) Pereiopod 2 left, lateral view; I) Pereiopod 4 right, mesial view; J) Pereiopod 4 right, propodus and dactylus, lateral view; K) Pectinate setae, P4 distoventral propodus ; L) Right antennula, dorsolateral view; M) Left antenna, lateral view. Scale bars: F, G, H, I, 2 mm; A, B, C, D, E, J, L, M, 1 mm; K, 0.2 mm.

reaching the cervical groove, which concurs completely with our specimen. Moreover, other characters in the genus *Eiconaxius*, such as the presence of pleurobranchiae and posteromedian tooth on telson posterior margin (vs both absent in *E. ferachevali*) and the absence of uropodal exopod transverse suture and postcervical carina (vs both present in *E. ferachevali*), keep our species separate from the genus *Eiconaxius* and, accordingly, from *E. borradailei.*

Habitat. The specimen was found on muddy coral rubble and shell debris at 470 m depth.

Type locality. Off Cape Timiris area, Mauritania (19°07′20″N, 16°50′31″W), 470 m depth.

Etymology. The species name derived from *fer à cheval*, the French expression for horseshoe, with reference to the horseshoe-shaped anterior gastric region.

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LAS COMUNIDADES DE DECÁPODOS

García-Isarch, E., S. de Matos-Pita, S., Muñoz, I., Mohamed, S. y Ramil, F. (en edición) Decapod assemblages in Mauritanian waters. En: Ramos, A., Sanz, J.L. and Ramil, F. (eds.). *Deep-sea ecosystems off Mauritania: Researching marine biodiversity and habitats in West African deep-waters*. Springer, Heidelberg (aceptado)

En este trabajo se aborda el estudio de los decápodos de los fondos blandos de la plataforma profunda y talud de Mauritania recogidos en 291 estaciones con el arte de arrastre comercial durante las cuatro campañas *Maurit*.

En total se recogieron 214.982 individuos, con una biomasa (peso fresco) de 1,6 toneladas, y se identificaron 118 especies pertenecientes a 39 familias.

La mayor diversidad correspondió al infraorden Caridea, en el que se incluyen la mayor parte de las especies comerciales, que estuvo representado por 40 especies. Las familias con mayor riqueza específica fueron Oplophoridae (12 especies) y Pandalidae (11 especies), seguidas por Inachidae (8 especies), Pasiphaeidae (7 especies) y Lithodidae, Penaeidae, Crangonidae y Sergestidae (5 especies cada una). El resto de las familias fueron menos diversas.

Nematocarcinus africanus Crosnier & Forest, 1973 fue la especie más abundante (37% del total), seguido por la gamba blanca *Parapenaeus longirostris* (Lucas, 1846) (19%), *Munida speciosa* von Martens, 1878 y *Glyphus marsupialis* Filhol, 1884. Los dos Peneidae, *P. longirostris* y *G. marsupialis* fueron también los decápodos que más contribuyeron a la biomasa total, siguiéndoles en orden de importancia *N. africanus*, *Neolithodes asperrimus* Barnard, 1947 y *Aristeus varidens* Holthius, 1952. *Acanthephyra pelagica* (Risso, 1816) fue la especie más frecuente habiéndose recolectado en el 57% (166 estaciones), *Hymenopenaeus chacei* Crosnier & Forest, 1969 (50%), *G. marsupialis* (44%), *Systellaspis debilis* (A. Milne-Edwards, 1881), *A. varidens* y *Stereomastis talismani* (Bouvier, 1917) (37%–38%).

Las mayores abundancias y biomasas de decápodos se localizaron al sur de Nouakchott entre 200 y 1000 m de profundidad, coincidiendo con la presencia de la barrera de coral y la zona de mínimo de oxígeno. La diversidad aumenta con la profundidad a lo largo de toda la costa, localizándose los valores más bajos a profundidades inferiores a 500 m y los máximos en el talud profundo, entre 500 y 1500 m.

El análisis multivariante basado en los datos de abundancias por especie y estación discriminó cinco asociaciones principales: plataforma (<100 m), plataforma profunda y talud superior (100–400 m), arrecife (400–550 m), talud medio (550–1400 m) y talud profundo (1400–1800 m). Cada agrupamiento está caracterizado por la presencia de unas especies concretas: *Munida* *speciosa* tipifica claramente la comunidad de la plataforma, siendo dominante en abundancia, biomasa y frecuencia, y responsable del 82% de la similaridad. La asociación de la plataforma profunda y talud superior está caracterizada por *Parapenaus longirostris*, junto con *Plesionika heterocarpus* (A. Costa, 1871, *M. speciosa* y *Macropipus rugosus* (Doflein, 1904). Las comunidades profundas están tipificadas por un número de entre 9 y 10 especies, no exhibiendo dominancias tan claramente definidas, excepto la del arrecife en la que *Nematocarcinus africanus* muestra su absoluta dominancia constituyendo el 82% de la abundancia y el 69% de la biomasa.

La profundidad, junto con otras variables dependientes de ella como la temperatura en el fondo y el contenido en materia orgánica, y la latitud parecen ser los principales factores que estructuran estas asociaciones.

Chapter 12
Decapod assemblages in Mauritanian waters

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Abstract

We studied the decapods collected in four trawling surveys conducted in Mauritanian waters, in 291 hauls performed at depths between 81 and 1825 m, in the period November-December of 2007-2010. A total of 214,982 specimens with a biomass of 1.6 tonnes was captured, Nematocarcinidae being the most abundant family, mainly due to one single species, *Nematocarcinus africanus*. *Parapenaeus longirostris* and *Glyphus marsupialis* were the species that most contributed to the total biomass, while *Acanthephyra pelagica* was the most common in all stations. With a total of 118 species, belonging to 39 families, Mauritanian waters are more diverse in decapods than other comparable zones, probably due to the coexistence of tropical and temperate species. Two new species were described and some records increased the geographic ranges of certain species in the Atlantic. Five main assemblages were identified: shelf (<100 m), deep shelf-upper slope (100–400 m), deep reef (400–550 m), middle slope (550–1400 m) and deep slope (1400–1800 m). Species of each assemblage are typified. Depth was the main factor structuring the assemblages, along with depth-dependant variables such as bottom temperature, longitude and organic matter content. Latitude also influenced assemblage structure. Greatest abundance and biomass occurred on the deep reef, in relation to minimum oxygen values (1.0–1.3 ml l^{-1}), which may favour the abundance certain species, such as *N. africanus*, but negatively affect other species, resulting in a diversity reduction. Diversity generally increased with depth, the highest values being registered on the deep slope.

Keywords: Decapods, crustaceans, diversity, abundance, bathymetric distribution, assemblages, deep-sea, Mauritania, North West Africa.

Introduction

The great productivity of Mauritanian waters (see **Chapter 4**) has encouraged the presence of foreign industrial trawling fleets for more than fifty years (Sobrino and García 1992), as well as the recent development of a national trawl fleet (FAO 2006). While shrimp trawlers operate to 750 m (Sobrino and García 1992; García-Isarch, Spanish Institute of Oceanography, unpublished data, 2010), in recent years hake trawlers have operated in progressively deeper waters, reaching up to 1000 m depth (FAO 2006, **Chapter 8**). The trawling fishing pressure on Mauritanian bottoms is assumed to have an impact on the benthic environment, both directly, by removing target and non-target species (Jennings and Kaiser 1998; Philippart 1998; Kaiser 2000), and indirectly, as a result of the physical disturbance of the habitat structures (Jones 1992; Auster at al. 1996). To date, only the direct effects of the shrimper fleet on catch and discard species have been studied in Mauritanian fishing grounds (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2011, 2012).

Macrobenthos composition is considered a good indicator of fishing pressure. Thus, changes in these communities are studied to evaluate the trawling effects on marine ecosystems. Decapods are amongst the dominant megabenthic taxa on the Atlantic continental shelf and slope, and the dominant group on the northwest African deep shelf and upper slope (Ramos, Spanish Institute of Oceanography, unpublished data, 2012). They are also a common component of deep benthic assemblages (Crosnier and Forest 1973). The importance of decapods in marine ecosystems also stems from their significant role in marine food webs, where they link high and low trophic levels (Cartes 1998), since they constitute an important food source for fish (Fanelli and Cartes 2010; Boudreau and Worm 2012, Torres 2013) and prey on a wide range of trophic levels (Fanelli et al. 2011a, b; Boudreau and Worm 2012; Torres et al. 2013). Thus, the diversity, wide distribution and ecological role of decapods make them an optimal target taxon for analyzing potential changes in the structure and dynamics of bathyal ecosystems (Cartes et al. 2007, 2014). The study of decapod communities in Mauritanian waters will therefore contribute to the analysis of potential changes in marine ecosystems attributed to anthropogenic activities (i.e., the trawling fishing impact on deep benthic communities) or linked to changes in climate and oceanographic conditions (see examples in Cartes et al. 2009b).

The state of the art of decapod knowledge in West Africa, recently reviewed by Muñoz et al. (2012), evidenced the general lack of specific studies about the ecology of decapods in Mauritanian waters. Assemblages of deep-sea decapods have been intensively studied in European waters, especially in the Mediterranean Sea and, to a lesser extent, in the North Atlantic (see examples referenced in Muñoz et al. 2012). Only a reduced number of studies on the decapod communities in West African waters included the analysis of deep-sea areas (Crosnier and Forest 1973; Macpherson 1991; Muñoz et al. 2012), and decapod assemblages in waters deeper than 1000 m are largely unknown.

In general, depth has been considered the main factor affecting the structure of deep-sea decapod communities (Abelló et al. 1988; Macpherson 1991; Cartes and Sardà 1993; Fariña et al. 1997; Company et al. 2004; Fanelli et al. 2007; Follesa et al. 2009; Papiol et al. 2012). Although environmental variables associated to depth (typically temperature and salinity) were not originally measured in deep-sea studies (Cartes and Sardà 1992; Maynou and Cartes 2000), recent analyses considered them as possible explanatory

variables of the depth-related trends found (Cartes et al. 2007; Fanelli et al. 2013; Cartes et al. 2014).
This study contributes to the knowledge of the ecology of decapods on the Mauritanian continental shelf and slope, as part of the global benthic study undertaken in the area (see **Chapters 10** and **11**). The aims of this work are to describe decapod fauna composition, and bathymetric and geographic distribution, to analyze their abundance and diversity, and to characterize the main assemblages and the environmental variables responsible for their distribution patterns.

Material and methods

Data collection

Decapods were collected at the 291 hauls carried out with the commercial Lofoten trawl during the four Maurit surveys. The description of the survey methodology is detailed in **Chapter 6** (see **Fig. 6.1** and **Table 6.1** for station data). Decapods collected at each trawl were sorted and initially identified on board to the lowest taxonomic level, then counted and weighed. A representative collection of all species was preserved in 70% ethanol for further study in the laboratory, where they were thoroughly examined.

Data analysis

Data matrices of numerical abundance and weight by species and station (number of individuals and biomass in kg) were standardized to 0.1 km^2 following the swept area method (see details in **Chapter 6**).
Ecological indicators, such as abundance (N), biomass (B), occurrence (F, frequency of appearance of the species in the hauls), species richness (S) and the Shannon-Wiener diversity index (H'), were estimated for each station. Total decapod abundance, biomass and diversity were spatially represented by geostatistical techniques. The main species were ranked in total abundance (N) and total biomass (kg). For each species, we also determined the bathymetric and latitudinal ranges in the zone studied.
To identify the species assemblages we applied clustering and non-metric multidimensional scaling (MDS) analysis to the similarity matrix obtained after performing a 4th root data transformation of species abundance (N) by station. Similarity levels between hauls were calculated by means of the Bray-Curtis index (Clifford & Stephenson, 1975). Species appearing in both low frequency (<4% of the hauls) and low abundance (<0.07% of N) were removed, as well as hauls where only one species was collected, in order to reduce the proportion of zeros in the matrix. A two-way crossed analysis of similarities (ANOSIM) was performed to test for statistically significant differences in the decapod assemblage structure between samples. The similarity percentages SIMPER procedure was used to characterize the species assemblage by calculating the contribution of each species to the similarity (typical species) and to the dissimilarity (discriminating species) between groups of samples belonging to the same depth stratum (Clarke and Warwick 2001). The above-mentioned ecological indicators were also calculated for the assemblages identified. Within each decapod assemblage, we ranked the main species in abundance, biomass and occurrence.

Environmental variables

Depth, latitude and longitude were registered in all the hauls performed. Bottom temperature was recorded by a net sensor in 189 hauls. Sediment variables (organic

matter, carbonate content and grain size proportion) were analysed for 60 stations (see **Chapter 3**).
To assess the influence of these environmental and geographical variables potentially affecting the distribution patterns of the decapod assemblages, we analysed their relationships through the BEST routine, by applying the BIOENV method and estimating the Spearman's rank correlations. A draftsman's plot was previously performed on the environmental and geographical data to search for autocorrelation among the potential variables identified, considering that variables were auto correlated when the Pearson's correlation (ρ) was higher than 0.7.
All analyses were computed with the software package PRIMER vs. 6 (Clarke and Warwick 2001).

Results

Global overview
A total of 118 decapod species, belonging to 39 families, were identified at depths ranging from 81 to 1825 m on the Mauritanian shelf and continental slope. **Table 12.1** shows the taxonomic list, together with the bathymetric and latitudinal ranges, habitat (benthic, nectobenthic or pelagic) and the main biotic variables for each species: N, B, and O. **Fig. 12.1** shows the bathymetric ranges of the main decapod species.
The most diversified group was the infraorder Caridea, represented by 40 species. The families with the highest species richness were Oplophoridae (12 species) and Pandalidae (11 species), followed by Inachidae (8 species), Pasiphaeidae (7 species) and Lithodidae, Penaeidae, Crangonidae and Sergestidae (5 species each) (**Fig. 12.2**). The other families were less diversified.
A total of 214,982 individuals reaching a biomass of 1.6 t were captured in the four *Maurit* surveys. Mean values of N and B were 7928 individuals *per* 0.1 km^2 and 56 kg *per* 0.1 km^2, respectively. Caridea and Dendobranchiata were the most important groups, contributing to the 51% and 31% of the total abundance and to the 40% and 30% of the biomass. Other important groups were Anomura (12% of abundance and 15% of biomass) and Brachyura (4% and 9% of abundance and biomass, respectively). Nematocarcinidae were the most abundant family (37% of the total abundance), mainly due to one single species, the African spider shrimp *Nematocarcinus africanus.* Together with Penaeidae (19%), this family accounted for more than half of the total abundance. The remaining families were present with abundances lower than 10% (**Fig. 12.3**). In terms of biomass, Pasiphaeidae (22%), Penaeidae (19%), Nematocarcinidae (17%) and Lithodidae (13%) were the most important families.
The highest decapod abundances were found between Nouakchott and the Senegalese border, continuously distributed between 200 and 1000 m depth (**Fig. 12.4a**). In northern Nouakchott, the highest abundance values were patchily distributed, peaking at southern Cape Blanc and off the Arguin Bank, and northern and southern Cape Timiris. Biomass followed a similar pattern in the northern area, while a patchy distribution was also found in the south. The highest biomasses in this zone were found in the southernmost area and also between 200 and 1000 m depth (**Fig. 12.4b**).
Diversity revealed a similar pattern along the entire Mauritanian coast, with the lowest values on the deep shelf and upper slope (<500 m) and the highest on the slope, between 500 and 1500 m, mainly off the Arguin Bank (**Fig. 12.4c**).
Table 12.2 shows N and B values and percentages of the dominant decapod species in the *Maurit* surveys, which together accounted for roughly 70% of the total; these species

appeared in more than 30% of the trawls. The other species were grouped as “others”. The most abundant species was the African spider shrimp *Nematocarcinus africanus* (264,339 individuals, 36.7%), followed by the deep-water rose shrimp *Parapenaeus longirostris* (186,773 individuals, 19.1%), the squat lobster *Munida speciosa* (74,519 individuals, 7.3%) and the kangaroo shrimp *Glyphus marsupialis* (50,077 individuals, 7.2%). Five species constituted around 70% of the total biomass: *P. longirostris* and *G. marsupialis* (around 297 kg, 18% each), *N. africanus* (270 kg, 17%), the king crab *Neolithodes asperrimus* (168 kg, 10.6%) and the striped red shrimp *Aristeus varidens* (96 kg, 6.1%).
The deep-sea shrimp *Acanthephyra pelagica* was the most common species, present in 57% of the hauls, followed by the solenocerid shrimp *Hymenopenaeus chacei* (50%), *Glyphus marsupialis* (44%), the fewspine spinytail *Systellaspis debilis*, *Aristeus varidens* and the blind lobster *Stereomastis talismani* (37%–38%). All species showed a similar bathymetric range oscillating between 300 and 1900 m. Of the species collected, 20% could be considered anecdotal, as they were only found at one station in all four surveys.

Structure of the assemblages
The MDS plot (stress = 0.08; **Fig. 12.5)** and the dendrogram generated by the multivariate analysis (**Fig. 12.6**) demonstrated that the decapod assemblages were strongly influenced by depth. A first branching at a low similarity level (below 5%) discriminates two main groups, characterizing the shelf-upper slope and the middle-deep slope. At a similarity level of 30%, five groups are clearly discriminated (depth ranges are approximate): 1) a group composed by hauls down to 100 m depth (“Shelf”, Sh); 2) a group of stations ranging between 100 and 400 m depth, corresponding to the “Deep shelf-Upper slope” (DSh-US); 3) the “Deep Reef” group (DR), consisting of hauls carried out near the deep-water coral reef, from 400 to 550 m; 4) a group of deep stations between 550 and 1400 m (“Middle Slope”, MS); and 5) another slope group including the deepest stations up to 1825 m depth (“Deep Slope”, DS). The overall value of the ANOSIM test (R = 0.89) proved that these five assemblages were statistically different (**Table 12.3**).
The SIMPER analysis showed that the average dissimilarity between the five assemblages ranged from 70.5% to 100% (**Table 12.4**), the MS assemblage being the most homogeneous with an average similarity of 52% (**Table 12.5**). **Table 12.4** shows the species responsible for the intergroup dissimilarities. Mean abundance, similarity percentage of contribution and cumulative percentages of each species in the five assemblages are shown in **Table 12.6**. Pictures of some of the main species are shown in **Fig. 12.7**.
Munida speciosa is clearly the discriminating species of the Sh assemblage (>82%), with small contributions of *Plesionika heterocarpus* and *Homola barbata*. This squat lobster is also the dominant species in terms of abundance, biomass and occurrence (**Table 12.6**), and is ubiquitous in this assemblage.
Four species, *Parapenaeus longirostris, Plesionika heterocarpus, Munida speciosa* and *Macropipus rugosus*, typified the DSh-US group. The dominant deep-water rose shrimp was also the main contributor species (58%) (Table 12.5), accounting for around 63% of both abundance and biomass (**Table 12.6**) and occurring at most stations of this assemblage (F = 95%).
Ten species contribute to the similarity in the DR assemblage and five account for 70% of this contribution (in decreasing order): *Pasiphaea semispinosa*, the African mud shrimp *Solenocera africana*, *Nematocarcinus africanus*, and the pandalid shrimps *Plesionika carinata* and *Plesionika acanthonotus.* Other species contributing, to a lesser extent, to group similarity were *Munida speciosa, Parapenaeus longirostris, Hymenopenaeus*

chacei, the golden shrimp *Plesionika martia* and the deep-water crab *Bathynectes piperitus* (lower than 7%). The African spider shrimp *N. africanus* was by far the most dominant species in the DR assemblage, in terms of abundance (82%) and biomass (69%) (**Table 12.6)**, but not in occurrence (65%), unlike most of the above-mentioned typifying species, whose occurrences were higher than 70%.

The MS community is also typified by ten species, which most contribute to group similarity (in decreasing order): *Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis* and *Hymenopenaeus chacei* (together accounting for 63%), *Stereomastis talismani, Systellaspis debilis, Nematocarcinus africanus, Heterocarpus grimaldii*, the sergestid shrimp *Sergia robusta* and *Plesionika carinata* (contribution lower than 10% each). In the MS, the first four contributing species were virtually ubiquitous, with occurrences ranging from 92% to 99% (**Table 12.8)**. *Nematocarcinus africanus* and *G. marsupialis* were the dominant species of this assemblage, both in terms of abundance (47% and 17%, respectively) and biomass (20% and 38.5%, respectively). The striped red shrimp *A. varidens* was the third species in abundance (11%) and biomass (13%) of the MS assemblage.

Nine species characterized the DS assemblage: *Acanthephyra pelagica, Pasiphaea tarda,* the polychelid blind lobster *Stereomastis nana* and *Hymenopenaeus chacei* (together, the four contributed to approximately 60% of the group similarity), the benthesicymid shrimp *Benthesicymus bartletti,* the flatback lobster *Stereomastis sculpta, Neolithodes asperrimus, Systellaspis debilis* and *Glyphus marsupialis* (9%–3% contribution). The king crab *N. asperrimus* was the most important species in terms of biomass (56%), while the anemone crab *Parapagurus pilosimanus* was the most abundant species (43%) (**Table 12.6**). The most typifying species, the pelagic shrimp *A. pelagica*, was virtually ubiquitous in the DS assemblage (F = 96%).

In general, decapod diversity indices increased with depth, the highest H’ and J’ occurring in the deep slope. Minimum values were registered in the DR assemblage (**Table 12.7**). Abundance and biomass increased with depth, from the minimal values of the Sh to their maxima in the DR assemblage, subsequently decreasing to the deepest waters.

The BEST results showed the bottom temperature as the main variable structuring the decapod assemblages off Mauritania. In fact, it offered the best correlation figures in all the abiotic variables matches and was highly correlated with longitude ($\rho = 0.85$), latitude ($\rho = 0.83$) and organic matter content ($\rho = 0.75$) (**Table 12.8**). Draftsman’s plots had previously shown that longitude, bottom temperature and organic matter were highly correlated with depth (negatively correlated with longitude and bottom temperature and positively correlated with organic matter content).

Discussion

Decapod diversity

With 118 species, decapods are the most diverse macrobenthic group in Mauritanian waters (see **Chapters 10 and 11**). The caridean shrimps are the most diversified taxon, which concurs with previous records from deep Atlantic waters off western Africa (Crosnier and Forest 1973; Macpherson 1991; Muñoz et al. 2012) and from the Mediterranean (Maynou et al. 1996; Maynou and Cartes 2000; Politou at al. 2005; Follesa et al. 2009; Ramírez-Llodra et al. 2010). The highest diversity of caridean shrimps in deep waters has also been reported at relatively similar latitudes of the Western Atlantic (Escobar-Briones et al. 2008). Oplophoridae were the most diverse, as also occurs in deep

waters of both the Eastern and Western Atlantic (Macpherson 1991; Escobar-Briones 2008).
Although it is difficult to compare the species richness of Mauritanian waters with other zones, due to differences in the sampled bathymetric ranges and/or sampling gears, habitats, etc., in general, decapods from Mauritanian waters show a higher diversity than those observed in other Atlantic areas (Macpherson 1991; Serrano et al. 2011; Cartes et al. 2014) and much higher than some areas of the Mediterranean, where wide bathymetric ranges were prospected (i.e., Cartes and Sardà 1992; Company et al. 2004).
However, the Mauritanian decapod diversity figures (S = 118 and H' = 3.22) strongly resemble those recorded in a similar study carried out in Guinea-Bissau (S = 122 and H' = 3.30) (Muñoz et al. 2012), but within different depth ranges, from 20 to 1000 m in Guinea-Bissau, and from 80 to 1800 m in Mauritania. Even when comparing a common bathymetric range of 80-1000 m in both studies, diversity values of Mauritania (S = 93 and H' = 2.71) are quite similar to those of Guinea Bissau (S = 89 and H' = 2.93) (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2014). Despite the similar global diversity of decapods in both West African areas, there are faunal differences, some of which could be explained by the presence of species distributed at depths not sampled in one area or another. For instance, the brachyuran crabs showed a much lower diversity in Mauritania than in Guinea-Bissau (27 *vs* 44 species), as most Guinea-Bissauan brachyurans were recorded in shallow waters, not prospected in Mauritania. The decreasing trend of brachyurans with depth, both in diversity (Soto 1991) and in abundance and biomass (Escobar-Briones et al. 2008), has been previously reported in other areas from approximately 600 m depth, probably due to the high trophic level of this group and the more limited food availability in deep waters. When the same bathymetric range is compared in Mauritania and Guinea-Bissau, certain species only occur in the waters of one country. In this case, differences are probably more related to the latitudinal distribution of each species, with a dominance of tropical species in Guinea-Bissau and a mixture of temperate and tropical species in Mauritania, whose waters are in a transitional region between these two biogeographical provinces (Maurin 1968; Domain 1980).
When waters deeper than 700 m are considered exclusively, decapod richness values found in Mauritania (S = 65) strongly resemble those of other areas in the Northeastern Atlantic (S = 67) (Cartes et al. 2014), but are higher than in the Western Mediterranean (S = 58) (Cartes et al. 2009a). However, in the Mauritanian deep slope the diversity is much higher than that estimated at similar depths in the Northeastern Atlantic (Cartes et al. 2014) (H' 3.1 *vs* 1.99). At similar depths, the number of species found in the middle slope (S = 64) is greater in Mauritania than in other areas such as the Northwest Mediterranean Sea (S = 40) (Papiol et al. 2012), which is in agreement with the lower representation of decapods (Cartes, 1993) and other faunal groups reported for the Mediterranean in relation to NE Atlantic waters (see examples in Cartes et al. 2004).This lower diversity in the Mediterranean has been related to the Messinian salinity crisis (5.7-5.4 million years ago), that drove most marine benthic species to extinction. The reopening of the Strait of Gibraltar 5 million years ago led the repopulation of the Mediterranean with the Atlantic fauna. However, the shallowness of the Gibraltar sill (280 m deep), which constitutes a physical barrier (Pérès, 1985), together with the biological filters constituted by hydrological characteristics of Mediterranean waters, prevent the species penetration and the colonization from the richer Atlantic fauna, contributing to the lower benthos diversity in deep Mediterranean waters.
Species richness is influenced by latitude and is highest in tropical and subtropical regions when compared to temperate and cold ones, where there is a significant decrease

(Abele 1982). However, as explained above, Mauritanian decapod diversity is exceptionally high compared with other temperate regions and very close to that described in similar studies carried out in tropical areas (Muñoz et al. 2012). On the one hand, this could be explained by the special hydrographic conditions of the area, where the marked seasonality of upwellings and the latitudinal displacement of the marine front along the Mauritanian and Senegalese coasts lead to important changes in environmental conditions: in a few weeks the ecosystem alternatively changes from a warm equatorial to a cold subtropical phase and *vice versa* (Meiners 2007). These special conditions allow for the coexistence of tropical and temperate species, enhancing global biodiversity. On the other hand, geomorphological bottom features, like the submarine canyons system and the deep-water coral reef along the Mauritanian slope (see **Chapter 17**), favour the heterogeneity of habitats, thereby enhancing diversity (Menot et al. 2010; Levin and Sibuet 2012).

The high diversity of Mauritanian decapods is reflected in new species and records that have been reported from the study of the decapods collected in the Maurit surveys. Two new decapod species have been described: *Munidopsis anaramosae* (de Matos-Pita and Ramil 2014), from north Mauritania, off the Arguin Banc at 1000 m depth, and *Paguristes candelae*, from south Nouakchott at 376 m (S. de Matos-Pita and Ramil 2015). In addition, the known bathymetric and geographical distribution ranges have been extended for some lithodid species (Muñoz and García-Isarch 2013), squat lobsters (S. de Matos-Pita and Ramil 2014), brachyuran crabs (S. de Matos-Pita et al. submitted), thalassinideans (S. de Matos-Pita and Ramil in press) and hermit crabs (S. de Matos-Pita and Ramil 2015).

Decapod assemblages

Five decapod assemblages, corresponding to the shelf, deep shelf-upper slope, deep reef, middle slope and deep slope, were identified in Mauritanian waters.

The structure of the shelf assemblage (81–100 m), strongly dominated by the squat lobster *Munida speciosa* (82.1% contribution), has not been previously reported at similar depths in other areas. This species is the main indicator of deeper assemblages in Guinea-Bissau (200–300 m) (Muñoz et al. 2012) and in Namibia (200–400 m) (Macpherson 1991). In our study, *M. speciosa* was also recorded up to 600 m depth, but as a minor contributor of deeper assemblages.

The deep shelf-upper slope assemblage (100–450 m) is clearly characterized by the dominance of the deep-water rose shrimp *Parapenaeus longirostris,* a typical deep shelf-upper slope species, also reported in the same bathymetric range in waters off Namibia (Macpherson 1991), Angola (Bianchi 1992b), Congo and Gabon (Bianchi 1992a) and Guinea-Bissau (Muñoz et al. 2012). This was the most important decapod species, in terms of biomass, of the four Maurit surveys. It is worth mentioning that *P. longirostris* is the main target species for the Spanish shrimper fleet in Mauritanian waters and that other contributor species of this assemblage, such as *Plesionika heterocarpus* and *Munida speciosa*, are found in the discards produced by this fleet at these depths (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2011, 2012). The specific composition of this Mauritanian decapod assemblage is quite similar to that identified in Guinea-Bissau between 200 and 300 m (Muñoz et al. 2012), although the contribution of each species differs greatly from one area to another. Certain similarities are also found with the decapod community described on the Namibian northern slope (Macpherson 1991).

The deep-reef assemblage (400–550 m) is typified by a number of species, of which *Pasiphaea semispinosa, Solenocera africana, Nematocarcinus africanus* and *Plesionika* *carinata* are the greatest contributors. The species composition of this assemblage shows certain similarities with the Guinea-Bissauan assemblage identified between 300 and 500 m depth (Muñoz et al. 2012). *Nematocarcinus africanus, Munida speciosa, Parapenaeus longirostris* and *Plesionika martia* are common species of these assemblages in both areas, although their percentage of contribution is different. The African spider shrimp *N. africanus* is the third typifying species and the main species in terms of abundance and biomass in the Mauritanian deep-reef assemblage. This species contributes to 45.2% of the assemblage identified between 300 and 500 m in waters off Guinea-Bissau and is also an indicator of the slope assemblage at 300–400 m depth in Congo, Gabon and Angola (Bianchi 1992a, b).

Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis and *Hymenopenaeus chacei* are the main contributor species of the middle slope assemblage (550–1400 m), followed by other species, such as *Stereomastis talismani, Systellaspis debilis, Nematocarcinus africanus, Heterocarpus grimaldii* and *Sergia robusta*. Some of these species are common to the Namibian slope/bathyal decapod assemblage (Macpherson 1991) and to the Guinea-Bissauan deep-slope assemblage (500–1000 m) (Muñoz et al. 2012), although the general assemblage structures are quite different in these three areas. It is worth mentioning the relative importance of the striped red shrimp *A. varidens*, the third species in landings from the European Union shrimp fleet operating in Mauritania, specifically targeted at depths around 600–750 m (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2011, 2012).

Some of the typifying species of the deep-slope assemblage belong to the families Oplophoridae (*Acanthephyra pelagica, Systellaspis debilis*), Pasiphaedae (*Pasiphaea tarda, Glyphus marsupialis*), Polychelidae (*Stereomastis nana, Stereomastis sculpta*) and Lithodidae (*Neolithodes asperrimus*), which are also the most representative families of the deep-slope assemblages found in other Atlantic regions, such as the Galicia Bank in the NE Atlantic (Cartes et al. 2014). *Acanthephyra pelagica, S. sculpta* and other species of *Hymenopenaeus* genus are also representative species in the deep-slope assemblages of Mediterranean areas (Cartes and Sardà 1993; Maynou and Cartes 2000).

The affinities found within families, genus or even species between the decapod deep assemblages of Mauritania and those of other Atlantic and Mediterranean areas are probably due to a common origin of the deep-sea fauna (Cartes 1993), whereas differences can be attributable to the intrinsic characteristics of each area studied. The uniqueness of the assemblage structure can be better explained by the combination of local environmental factors and the biogeographical history of the region considered (Maynou and Cartes 2000).

Environmental variables influencing Mauritanian decapod communities

Depth and depth-dependent variables, together with latitude, seem to be the main causes structuring decapod assemblages on the Mauritanian shelf and continental slope, as observed in other areas of the Atlantic (Lleonart and Roel 1984; Macpherson 1991; Fariña 1997; Muñoz et al. 2012) and the Mediterranean (Abelló et al. 1988, Cartes and Sardà 1993; Company et al. 2004; Fanelli et al. 2007; Follesa et al. 2009; Papiol et al. 2012). However, depth should be considered as a proxy for a combination of several environmental variables affecting organisms (Papiol et al. 2012). In fact, depth is not a causative factor and other variables, such as temperature, high pressure, food availability and turbidity, have also been proposed to cause faunistic changes in the bathymetric gradient (Carney 2005; Fanelli et al. 2013; Cartes et al. 2014). In our study, other depth-related physical and ecological variables, such as bottom temperature and organic matter content, seem to play an important role in structuring decapod assemblages. In general, temperature has been suggested as a primary cause influencing faunal zonation in deep-sea communities (Gage and Tyler 1991) and organic matter content has been identified as one of the most dominant variables affecting the distribution of deep-sea decapods (Cartes et al. 2007).

In Mauritania, the biomass and abundance of decapods increase with depth from the shelf (minimum values) to the deep reef, peaking at 400–550 m depth, decreasing beyond these depths until reaching new minima values on the deep slope. Surprisingly, the greatest concentrations of decapods in the deep reef are found at depths recording minimum values of oxygen (1.0–1.3 ml l^{-1} between 300 and 550 m), along practically all the Mauritanian coast, from Cape Timiris to the Senegalese border (See **Chapter 4**). This coincidence of the highest decapod biomass with oxygen minimum values and maximum turbidity near the bottom is also reported in the Mediterranean (Fanelli et al. 2013), although oxygen minimum values in these waters (around 4.0-4.2 ml l^{-1} between 450-550 m) are no so limiting as in Mauritania. In the Mediterranean, the assemblage recording the highest decapod biomass occurring in the minimum oxygen zone was also the most diverse. However, in Mauritanian waters the deep-reef assemblage recorded the minimum diversity values despite the highest biomass coinciding with minimum oxygen values. Certain decapods, especially deep-shrimp species, seem to be less sensitive to low oxygen values than other groups. This capacity of some deep-sea shrimps genera (i.e., *Solenocera*, *Nematocarcinus* and *Plesionika*) to live in low oxygenated waters has also been observed in the Mexican Pacific (Hendrickx and Serrano 2010), where this capacity is an ecological advantage, since it reduces competition for space and food with other groups that are much more sensitive to these adverse conditions. Our results show that the highest abundance and biomass of the deep-reef assemblage are mainly attributed to one single species, the African spider shrimp *Nematocacinus africanus*, which is probably less sensitive to low oxygen concentrations. This dominance also explains the low diversity of this assemblage. Beyond 550 m, decapod abundance and biomass exhibited the typical decrease observed in deep-sea environments (Haedrich et al. 1980; Cartes and Sardà 1992; Company et al. 2004; Politou et al. 2005; Cartes et al. 2007; Follesa et al. 2009; Fanelli et al. 2013), in agreement with the well-established general pattern for deep-sea benthos associated with low food availability in deep bottoms (Rowe 1983; McClain et al. 2008).

In Mauritanian waters, decapod diversity displays a different pattern than abundance and biomass, generally increasing with depth and peaking over the deep slope, between 1400 and 1825 m. The increasing diversity with bathymetry is only disrupted in the deep-reef assemblage, where minimum values were recorded, probably in relation to the dominance of a limited number of species better adapted to low oxygen levels (i.e., *Nematocacinus africanus*). The observed increase in decapod diversity with depth is an uncommon feature, although it has already been reported in certain areas of the Mediterranean (Follesa et al. 2009). More generally speaking, maximum diversity values have been recorded for macrofauna, megafauna and fish between 1500 and 2500 m in the western North Atlantic (Rex 1983), suggesting the existence of biodiversity "hot spots" at these depths (Levin and Sibuet 2012). Several hypotheses have been proposed to explain the diversity peak observed at intermediate slope depths (1000–2500 m), including competition, predation, productivity, environmental heterogeneity and patch dynamics, as well as different combinations of them (see review in Snelgrove and Smith 2002).

Latitude also influences the assemblage structure, although it is masked by the strong effect of depth. This latitudinal influence may be due to secondary variables that vary with latitude (such as those related with the oceanography and geomorphology of the area). Latitudinal patterns were also detected in the global values of decapod abundance and biomass along the Mauritanian coast, as observed for global macrobenthos (Ramil et al. **Chapter 10**), and generally increased southwards. Some especially rich areas for decapods were also located north and south of Cape Timiris. The differences found in the biomass and abundance patterns are attributable to the size of the dominant individuals in certain areas (i.e., those areas with high abundances and low biomass are dominated by small species and specimens, whereas high biomass and low abundance zones are mainly represented by large species and individuals) (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2014).

In general, species tend to occupy discrete depth bands which progressively replace each other by moving from shelf to abyssal depths (Carney 2005). Thus, benthic assemblages show clear boundaries or a discontinuity pattern of distribution in the vertical gradient (Rowe 1981), which vary according to locations (Maynou and Cartes 2000). Causes of zonation have been mainly attributed to gradients in environmental parameters (i.e., light, temperature, food availability) that co-occur with depth and that affect the biology and physiology of marine organisms and the ecological interactions between taxa (Rex 1976; Rowe 1981; Carney 2005). In Mauritanian waters, the zonation of the decapod communities has bathymetric boundaries located at depths around 100, 400, 550 and 1400 m. The 100 m boundary may be related to the upper limit of the permanent thermocline (See **Chapter 4**). At 400 m, the occurrence of a bottom minimum oxygen layer and the location of the great deep-water coral reef (See **Chapters 4** and **17**) may favour the clearly observed species replacement occurring at that depth. The influence of the bottom low oxygen levels on the zonation of decapod assemblages was suggested by Macpherson (1991) in West African waters off Namibia. In fact, the bottom Oxygen Minimum Zone (OMZ) is a dispersal barrier for the continental shelf species (Hendrickx 2001) and OMZ boundaries form sub-zones with great heterogeneity of environmental variables, constituting abrupt shifts in animal communities (Sellanes et al. 2010). The 550 m depth boundary must be related to a new increase in oxygen levels (See **Chapter 4**), constituting a zone with a high species turnover, which is quite common in the upper slopes (around 500 m) of different areas (Carney 2005). In fact, depths around 500–650 m have also been cited as faunal boundaries for decapods in North Atlantic areas (Cartes et al. 2007) and for all invertebrates in the western Mediterranean Sea (Cartes et al. 2009a). The faunal discontinuity found around 1400 m has been reported at similar depths (between 1200 and 1500 m) in other areas of the Atlantic (Wenner and Boesch 1979; Hecker 1990; Cartes et al. 2014) and the Mediterranean (Cartes and Sardà 1993; Cartes 1993; Fanelli et al. 2013) and is probably related to trophic factors (Cartes and Sardà, 1993). This depth is considered as the beginning of the abyssal zone (Carney, 2005). It is worth noting that the boundaries definition varies among different taxa (Cartes and Sardà 1993), due to their distinct trophic levels (Maynou and Cartes 2000). Different groups of fish and invertebrates may exploit different fractions of food resources and therefore show different response patterns to a depth gradient.

In conclusion, this work provides the first contribution to the knowledge of decapod communities in Mauritanian waters, including an analysis of the composition, distribution, abundance and structure of decapod assemblages. This constitutes a reference point for assessing potential changes in the structure of the ecosystem, attributable either to changes in climate and oceanographic conditions or to anthropogenic causes, such as trawling fishing pressure. In this sense, special attention must be given to the shelf and deep shelf-upper slope assemblages, which are more susceptible to being affected by fishing pressure, such as that currently exerted by the trawling shrimper fleet targeting *P. longirostris* in the area (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2014) at these assemblage depths. Because of the lower resilience and higher vulnerability of the deep-sea benthic ecosystem (>200 m depth), the impact of trawling is more severe and lasts longer than in shallower areas (Jones 1992; Rex and Etter 2010). However, current fishing pressure beyond 350 m is somewhat diminished, due to the relative limited effort exerted by the shrimper fleet when targeting deep-sea crustaceans (García-Isarch, Spanish Institute of Oceanography, unpublished data, 2013) and to the recent, considerable reduction in the hake trawler fleet, usually operating in deeper waters (**Chapter 8**).

These types of studies are useful tools for the implementation of an ecosystem-based approach to fisheries management (Pikitch et al. 2004), which reverses the order of management priorities and starts with the ecosystem rather than with the target species.

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Table 12.1 Taxonomic list of decapods inhabiting the Mauritanian deep shelf and continental slope and their main biological variables (N: Numerical abundance; B: biomass, in kg; O: occurrence, % of stations;
DR: depth range, in m; LR: latitudinal range, in º; H: habitat, B: benthic; P: pelagic; N: nectobenthic). Systematic arrangements after de Grave et al. (2009), Ayong et al. (2010, 2011) and Schnabel and Ahyong (2010)

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Suborder Dendrobranchiata							
Superfamily Penaeoidea							
Family ARISTEIDAE	*Aristaeopsis edwardsiana* (Johnson, 1868)	53	0.54	3.2	554-1016	20.8-16.1	B
	Aristaeomorpha foliacea (Risso, 1827)	12	0.17	0.7	618-850	20.8-19.8	N
	Aristeus antennatus (Risso, 1816)	238	2.57	8.2	415-1236	20.7-16.1	N
	Aristeus varidens Holthius, 1952	30677	308.09	37.4	403-1556	20.8-16.1	B
Family BENTHESICYMIDAE	*Benthesicymus bartletti* Smith, 1882	1340	9.04	19.2	1010-1867	20.8-16.1	B
Family PENAEIDAE	*Farfantepenaeus notialis* (Pérez Farfante, 1967)	12	0.33	0.7	93-146	19.2-18.8	B
	Funchalia danae Burkenroad, 1940	3.2	<0.01	0.4	1195-1199	19.4-19.3	P
	Metapenaeopsis miersi (Holthuis, 1952)	5.5	<0.01	0.4	101-120	19.2	B
	Parapenaeus longirostris (Lucas, 1846)	186773	1307.24	27.8	86-803	20.6-16.1	B
	Pelagopenaeus balboae (Faxon, 1893)	6	<0.01	0.4	1656-1657	16.7	P
Family SICYONIIDAE	*Sicyonia galeata* Holthuis, 1952	3	<0.01	0.4	85-87	18.2	B
Family SOLENOCERIDAE	*Hymenopenaeus chacei* Crosnier & Forest, 1969	18792	26.14	49.8	343-1750	20.8-16.1	B
	Solenocera africana Stebbing, 1917	3898	24.92	14.2	173-861	20.7-16.1	N
Superfamily Sergestoidea							
Family SERGESTIDAE	*Eusergestes arcticus* (Krøyer, 1855)	5	<0.01	0.4	334-352	20.7	P
	Sergia grandis (Sund, 1920)	179	1.08	12.1	615-1777	20.7-16.1	P
	Sergia robusta (Smith, 1882)	1694	2.26	22.1	390-1769	20.8-16.1	P
	Sergia sp	366	0.46	7.5	311-1862	20.8-16.3	
	Sergia talismani (Barnard, 1947)	34	0.02	0.7	390-650	20.6-17.4	P
Suborder Pleocyemata							
Infraorder Caridea							
	Caridea indet.	13	0.1	1.4	827-1435	20.5-18.7	-
Superfamily Alpheoidea							
Family HIPPOLYTIDAE	*Lebbeus africanus* Fransen, 1997	16	0.03	0.7	1000-1749	20.3-20	B

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Superfamily Crangonoidea							
Family CRANGONIDAE	*Aegaeon cataphractus* (Olivi, 1792)	20	0.02	1.8	80-112	19.4-16.9	
	Aegaeon lacazei (Gourret, 1887)	94	0.07	2.9	79-675	20.7-16.1	B
	Metacrangon bellmarleyi (Stebbing, 1914)	86	0.13	6.8	557-1384	20.7-16.4	B
	Parapontophilus gracilis gracilis (Smith, 1882)	51	0.04	1.4	556-1010	18.1-17.2	B
	Sabinea hystrix (A. Milne-Edwards, 1881)	47	0.62	4.3	862-1811	20.8-16.1	B
Family GLYPHOCRANGONIDAE	*Glyphocrangon longirostris* (Smith, 1882)	256	3.12	4.9	1531-1867	20.7-16.7	B
Superfamily Nematocarcinoidea							
Family NEMATOCARCINIDAE	*Nematocarcinus africanus* Crosnier & Forest, 1973	264339	909.26	24.2	173-1064	20.8-16.1	B
	Nematocarcinus ensifer (Smith, 1882)	14	0.11	0.4	1778-1811	19.4	B
Superfamily Oplophoroidea							
Family OPLOPHORIDAE	*Acanthephyra acanthitelsonis* Bate, 1888	6	0.06	0.7	1422-1685	18.1-16.7	P
	Acanthephyra curtirostris Wood-Mason & Alcock, 1891	3	<0.01	0.4	1590-1599	16.2-16.1	P
	Acanthephyra eximia Smith, 1884	237	2.89	10.3	1160-1867	20.8-16.1	N
	Acanthephyra pelagica (Risso, 1816)	12741	38.86	57.0	402-1862	20.8-16.1	P
	Ephyrina figueirai figueirai Crosnier & Forest, 1973	10	0.09	1.1	1010-1572	19.9-16.5	P
	Ephyrina sp	10	0.09	0.7	1095-1530	19.9-19.1	-
	Notostomus crosnieri Macpherson, 1984	84	0.47	8.9	774-1698	20.2-16.4	P
	Notostomus gibbosus A. Milne-Edwards, 1881	24	0.18	2.9	1308-1824	20.8-17	P
	Oplophorus spinosus (Brullé, 1839)	33	0.05	3.2	557-1598	20.7-16.8	P
	Systellaspis cristata (Faxon, 1893)	14	0.04	1.4	1178-1547	19.8-16.3	P
	Systellaspis debilis (A. Milne-Edwards, 1881)	3305	4.18	38.8	343-1862	20.8-16.1	P
	Systellaspis pellucida (Filhol, 1885)	6	<0.01	0.7	1560-1685	18.5-16.7	B
Superfamily Pasiphaeoidea							
Family PASIPHAEIDAE	*Glyphus marsupialis* Filhol, 1884	50077	961.08	43.8	334-1867	20.8-16.1	B
	Parapasiphae sulcatifrons Smith, 1884	3	0.02	0.4	1590-1599	16.2-16.1	P
	Pasiphaea multidentata Esmark, 1866	586	4.53	20	557-1683	20.8-17.6	P
	Pasiphaea semispinosa Holthius, 1951	14958	16.47	21.0	216-1667	20.8-16.1	P
	Pasiphaea tarda Krøyer, 1845	2411	119.48	22.8	1091-1867	20.7-16.1	P
	Pasiphaea sp	10	0.02	0.7	896-1160	19.6-19.4	-
	Psathyrocaris fragilis Wood-Mason & Alcock, 1893	7204	29.15	15	415-1146	20.7-16.1	B

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Superfamily Pandaloidea							
Family PANDALIDAE	*Heterocarpus ensifer* A. Milne-Edwards, 1881	143	0.51	2.1	278-628	20.7-16.4	B
	Heterocarpus grimaldii A. Milne-Edwards & Bouvier, 1900	3270	45.12	23.1	712-1532	20.8-16.2	B
Family PANDALIDAE	*Plesionika acanthonotus* (Smith, 1882)	3393	9.57	9.6	252-801	20.7-16.4	N
	Plesionika brevipes (Crosnier & Forest, 1968)	6865	25.53	4.3	215-473	18.7-16.1	
	Plesionika carinata Holthius, 1951	13849	26.26	22.1	230-1677	20.7-16.1	P
	Plesionika edwarsii (Brandt, 1851)	159	0.90	2.9	252-436	18.1-16.1	N
	Plesionika ensis (A. Milne-Edwards, 1881)	26	0.07	0.7	210-341	19.1-18.7	B
	Plesionika heterocarpus (A. Costa, 1871)	22373	52.69	21.3	86-861	20.7-16.1	N
	Plesionika martia (A. Milne-Edwards, 1883)	908	2.95	6.1	274-693	20.7-16.1	N
	Plesionika narval (Fabricius, 1787)	536	1.36	1.4	87-146	19.4-18.3	B
	Plesionika sp	71	0.08	1.1	343-626	20.7-17.9	
Infraorder Polychelida							
Superfamily Erynoidea							
Family POLYCHELIDAE	*Stereomastis nana* (Smith, 1884)	1340	15.5	10.7	1290-1867	20.8-16.1	B
	Stereomastis sculpta (Smith, 1880)	1110	22	13.9	1214-1717	20.8-16.1	B
	Stereomastis talismani (Bouvier, 1917)	7682	135	36.7	452-1717	20.8-16.1	B
	Polycheles typhlops Heller, 1862	7	0.02	0.7	464-675	20.5-17.8	B
Infraorder Achelata							
Superfamily Palinuroidea							
Family PALINURIDAE	*Palinurus mauritanicus* Gruvel, 1911	367	137.05	5.7	200-532	20.7-16.5	B
Family SCYLLARIDAE	*Scyllarus caparti* Holthuis, 1952	5	0.03	0.4	103	18-17.9	B
	Scyllarus subarctus Crosnier, 1970	264	1.17	4.3	88-172	20.7-16.2	B
Infraorder Astacidea							
Superfamily Nephropoidea							
Family NEPHROPIDAE	*Nephropsis atlantica* Norman, 1882	555	4.81	10	724-1317	20.7-16.3	B
Infraorder Axiidea							
Superfamily Axioidea							
Family AXIIDAE	*Calocarides* sp	3	<0.01	0.4	562-637	16.4-16.3	B
Superfamily Callianassoidea							
Family CALLIANASSIDAE	*Callianassa oblonga* Le Loeuff and Intès, 1974	5	<0.01	0.4	358-364	17.5	B

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Infraorder Anomura							
Superfamily Chirostyloidea							
Family EUMUNIDIDAE	*Eumunida bella* de Saint Laurent & Macpherson, 1990	4	0.24	0.4	618-850	19.8	B
Superfamily Galatheoidea							
Family MUNIDIDAE	*Munida guineae* Miyake & Baba, 1970	88	0.41	0.4	452-468	16.4	B
	Munida speciosa von Martens, 1878	74510	143.33	25.9	80-606	20.7-16.1	B
Family MUNIDOPSIDAE	*Munidopsis anaramosae* de Matos-Pita & Ramil, 2014	3	<0.01	0.4	1006-1012	20.3	B
	Munidopsis chunii Balss, 1913	10239	10.45	6.1	896-1862	19.9-16.4	B
	Munidopsis curvirostra Whiteaves, 1874	40	0.03	2.5	1680-1867	20.7-19.5	B
	Munidopsis serricornis (Lovén, 1852)	3	0.003	0.4	975-984	20.7	B
Superfamily Paguroidea							
	Paguroidea indet.	60	0.1	1.4	87-427	18.8-16.2	B
Family DIOGENIDAE	*Dardanus arrosor* (Herbst, 1796)	185	0.52	7.8	80-540	20.7-16.1	B
	Diogenes pugilator (Roux, 1829)	15	0.02	0.4	100-105	19.6	B
	Paguristes mauritanicus Bouvier, 1906	5	<0 01	0.4	103	18-17.9	B
	Paguristes n sp	3	0.08	0.4	376-377	17.7	-
Family PAGURIDAE	*Anapagurus laevis* (Bell, 1846)	26	0.03	0.7	86-105	19.6-19.4	B
	Pagurus alatus Fabricius, 1775	36	0.08	2.5	80-430	20-16.1	B
	Pagurus cuanensis Bell, 1845	233	0.44	6.4	84-174	20.7-16.1	B
	Pagurus prideaux Leach, 1815	50	0.17	1.4	87-120	20.7-20.4	B
Family PARAPAGURIDAE	*Paragiopagurus macrocerus* (Forest, 1955)	14	0.06	0.7	322-364	20.4-18.3	B
	Parapagurus nudus (A. Milne-Edwards, 1891)	6	0.02	0.7	1659-1688	17.7-16.7	B
	Parapagurus pilosimanus Smith, 1879	10139	58.56	10.7	403-1577	20.8-16.1	B
Superfamily Lithodoidea							
Family LITHODIDAE	*Lithodes ferox* Filhol, 1885	103	87.45	5.7	415-1682	20.8-16.3	B
	Neolithodes asperrimus Barnard, 1947	309	518.95	16	997-1862	20.8-16.1	B
	Neolithodes grimaldii (A. Milne-Edwards & Bouvier, 1894)	13	23.11	1.1	1680-1862	20.7-19.9	B
	Paralomis cristulata Macpherson, 1988	12	1.46	1.5	744-984	20.8-17.1	B
	Paralomis erinacea Macpherson, 1988	81	14.15	3.6	1091-1347	19.4-16.2	B

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Infraorder Brachyura							
Superfamily Calappoidea							
Family CALAPPIDAE	*Acanthocarpus brevispinis* Monod, 1946	28	2.52	1.8	274-598	18.4-16.1	B
	Calappa pelii Herklots, 1851	3	0.08	0.4	80-98	19.3-19.2	B
Superfamily Dorippoidea							
Family DORIPPIDAE	*Medorippe lanata* (Linnaeus, 1767)	5	<0.01	0.4	86-90	19.4	B
Superfamily Goneplacoidea							
Family GONEPLACIDAE	*Goneplax barnardi* (Capart, 1951)	58	0.11	2.5	278-650	18.9-16.1	B
	Goneplax rhomboides (Linnaeus, 1758)	26	0.07	1.1	88-322	20-17.8	B
Superfamily Grapsoidea							
Family PLAGUSIIDAE	*Euchirograpsus liguricus* H. Milne Edwards, 1853	--	--	0.4	311	18.3	B
Superfamily Homoloidea							
Family HOMOLIDAE	*Homola barbata* (Fabricius, 1793)	106	0.37	5.3	80-404	20.7-16.1	B
	Paromola cuvieri (Risso, 1816)	137	91.69	3.9	274-850	20.7-16.1	B
Superfamily Majoidea							
Family EPIALTIDAE	*Pisa armata* (Latreille, 1803)	37	0.19	2.5	92-146	19.2-16.1	B
Family INACHIDAE	*Inachus aguiarii* de Brito Capello, 1876	30	0.05	1.8	93-112	17.1-16.1	B
	Inachus angolensis Capart, 1951	246	0.52	4.6	81-362	20.6-16.7	B
	Inachus leptochirus Leach, 1817	27	0.03	0.7	145-352	20.7-20.6	B
	Inachus nanus Manning & Holthuis, 1981	23	0.02	1.4	85-200	20-18.2	B
	Macropodia gilsoni (Capart, 1951)	154	0.15	6.1	80-189	19.6-16.1	B
	Macropodia hesperiae Manning & Holthuis, 1981	14	<0.01	1.1	80-102	19-16.9	B
	Macropodia longipes (A. Milne Edwards & Bouvier, 1899)	6	<0.01	0.4	110-112	16.3	B
	Macropodia macrocheles (A. Milne Edwards & Bouvier, 1898)	133	0.11	4.3	93-540	19.8-16.6	B
Family MAJIDAE	*Eurynome aspera* (Pennant, 1777)	11	0.02	0.7	115-177	20-19.7	B
Superfamily Leucosioidea							
Family LEUCOSIIDAE	*Ebalia nux* A. Milne Edwards, 1883	3	<0.01	0.4	271-305	20.6	B
	Pseudomyra mbizi Capart, 1951	10	0.02	0.7	163-404	19.3-16.5	B
Superfamily Parthenopoidea							
Family PARTHENOPIDAE	*Solenolambrus noordendei* (Capart, 1951)	137	0.14	2.5	86-200	20.7-18.7	B
	Spinolambrus notialis (Manning & Holthuis, 1981)	9	0.01	0.7	102-174	19.6-17	B

Taxa	Species	N	B (kg)	O(%)	DR (m)	LR (º)	H
Superfamily Portunoidea							
Family GERYONIDAE	*Chaceon maritae* (Manning & Holthuis, 1981)	352	86.63	10.3	402-1390	20.8-16.1	B
Family MACROPIPIDAE	*Bathynectes piperitus* Manning & Holthuis, 1981	494	8.41	10.3	260-850	20.7-16.3	B
	Macropipus rugosus (Doflein, 1904)	30805	296.81	10.7	79-257	20.7-16.1	B
Superfamily Xanthoidea							
Family XANTHIDAE	*Monodaeus cristulatus* Guinot & Macpherson, 1988	31	0.04	1.8	100-311	19.6-16.1	B

Table 12.2 Numerical abundance (N), biomass (B, in kg) and occurrence (O, species with presence in >30% of stations), of the dominant decapods in the *Maurit* surveys

Species	N	N (%)	Species	B (kg)	B (%)	Species	O (%)
Nematocarcinus africanus	264339	36.7	*Parapenaeus longirostris*	297	18.8	*Acanthephyra pelagica*	56.9
Parapenaeus longirostris	186773	19.1	*Glyphus marsupialis*	296	18.7	*Hymenopenaeus chacei*	49.8
Munida speciosa	74510	7.3	*Nematocarcinus africanus*	270	17.0	*Glyphus marsupialis*	43.8
Glyphus marsupialis	50077	7.2	*Neolithodes asperrimus*	168	10.6	*Systellaspis debilis*	38.8
Others (114 spp)	742685	29.6	*Aristeus varidens*	96	6.1	*Aristeus varidens*	37.4
			Others (113 spp)	457	28.8	*Stereomastis talismani*	36.7

Table 12.3 ANOSIM test results: R values between the five assemblages identified by the cluster analysis, at a significance level of 0.1%. Acronyms of assemblages: Sh, Shelf; DSh-US, Deep shelf–Upper slope; DR, Deep Reef; MS, Middle Slope; DS, Deep Slope

Assemblage	Sh	DSh-US	DR	MS
DSh-US	0.67			
DR	0.98	0.66		
MS	1.00	0.99	0.90	
DS	1.00	0.99	0.98	0.72

Table 12.4 Summarized results of the SIMPER analysis. Average of dissimilarity between the five assemblages and contribution of the main discriminating decapod species

Assemblage	Sh	DSh-US	DR	MS
DSh-US	80.23			
DR	90.13	77.60		
MS	99.76	98.30	80.84	
DS	100. 00	99.77	92.98	70.46

Assemblage	Sh	DSh-US	DR	MS
DSh-US	*P. longirostris* 32.00			
DR	*P. semispinosa* 12.78	*N. africanus* 12.17		
MS	*G. marsupialis* 9.81	*P. longirostris* 12.89	*N. africanus* 9.93	
DS	*M. speciosa* 16.04	*P. longirostris* 18.39	*N. africanus* 10.14	*A. varidens* 10.74

Table 12.5 Most important species, in terms of percentage contribution to the group similarity, (SIMPER analysis) listed for each group resulting from the cluster analysis. A cut-off at a cumulative similarity of 90% was applied to the data analysis

Assemblage *Species*	Av. Ab.	Av. Sim	Contr. %	Cum %
Shelf (83–100 m)		47.78		
Munida speciosa	4.38	39.25	82.14	82.14
Plesionika heterocarpus	1.29	2.12	4.43	86.57
Homola barbata	0.62	1.91	4.00	90.56
Deep Shelf - Upper slope (100 –400 m)		44.49		
Parapenaeus longirostris	7.32	25.78	57.94	57.94
Plesionika heterocarpus	3.35	7.33	16.48	74.43
Munida speciosa	2.85	5.55	12.46	86.89
Macropipus rugosus	1.87	2.23	5.01	91.90
Deep Reef (400-550 m)		44.42		
Pasiphaea semispisona	4.89	8.74	19.68	19.68
Solenocera africana	3.34	6.31	14.21	33.89
Nematocarcinus africanus	6.69	5.42	12.21	46.09
Plesionika carinata	3.96	5.38	12.12	58.21
Plesionika acanthonotus	3.17	4.89	11.00	69.21
Munida speciosa	2.31	3.27	7.36	76.58
Parapenaeus longirostris	3.03	3.12	7.02	83.60
Hymenopenaeus chacei	1.74	1.54	3.47	87.07
Plesionika martia	1.69	1.30	2.92	89.99

Assemblage *Species*	Av. Ab.	Av. Sim	Contr. %	Cum %
Middle Slope (550-1400 m)		52.07		
Acanthephyra pelagica	3.82	9.10	17.47	17.47
Aristeus varidens	4.33	8.68	16.67	34.14
Glyphus marsupialis	4.30	8.13	15.61	49.75
Hymenopenaeus chacei	3.57	7.08	13.61	63.36
Stereomastis talismani	2.65	4.75	9.12	72.48
Systellaspis debilis	2.07	3.50	6.72	79.20
Nematocarcinus africanus	3.11	2.14	4.12	83.31
Heterocarpus grimaldii	1.50	1.96	3.76	87.08
Sergia robusta	1.13	1.96	3.76	87.08
Plesionika carinata	1.43	0.99	0.42	89.68
Deep Slope (1400-1825 m)		45.29		
Acanthephyra pelagica	2.80	12.12	26.76	26.76
Pasiphaea tarda	2.16	5.90	13.02	39.78
Stereomastis nana	1.71	4.72	10.42	50.20
Hymenopenaeus chacei	1.88	4.17	9.21	59.41
Benthesicymus barletti	1.61	3.84	8.49	67.90
Stereomastis sculpta	1.66	3.67	8.11	76.01
Neolithodes asperrimus	1.15	2.95	6.52	82.52
Systellaspis debilis	1.01	2.02	4.47	86.99
Glyphus marsupialis	1.10	1.47	3.26	90.25

Table 12.6 Percentage of decapods abundance, biomass and occurrencewithin the five assemblages. Occurrence (O) is presented for species with values >30%

Assemblage/*Species*	N (%)		B (%)		O (%)
Shelf (83–100 m) Sim: 47.8					
Munida speciosa	74.1	*Munida speciosa*	80.0	*Munida speciosa*	100.0
Others (28 spp)	25.9	Others (28 spp)	20.0	*Homola barbata*	33.3
				Macropodia gilsoni	33.3
				Pagurus cuanensis	33.3
				Plesionika heterocarpus	33.3
Deep Shelf - Upper slope (100 –400 m) Sim: 44.5					
Nematocarcinus africanus	62.9	*Parapenaeus longirostris*	63.4	*Parapenaeus longirostris*	95.3
Macropipus rugosus	15.5	*Macropipus rugosus*	19.8	*Plesionika heterocarpus*	67.2
Others (48 spp)	21.6	Others (48 spp)	16.8	*Munida speciosa*	56.3
				Solenocera africana	37.5
				Macropipus rugosus	32.8
				Pasiphaea semispinosa	31.3

Assemblage/*Species*	N (%)		B (%)		O (%)
Deep Reef (400-550 m) Sim: 44.4					
Nematocarcinus africanus	81.6	*Nematocarcinus africanus*	69.4	*Pasiphaea semispinosa*	88.2
Others (40 spp)	18.4	*Parapenaeus longirostris*	6.5	*Solenocera africana*	88.2
		Others (39 spp)	24.1	*Plesionika acanthonotus*	82.4
				Plesionika carinata	76.5
				Munida speciosa	70.6
				Nematocarcinus africanus	64.7
				Parapenaeus longirostris	64.7
				Bathynectes piperitus	52.9
				Hymenopenaeus chacei	52,9
				Plesionika martia	52.9
				Aegaeon lacazei	35.3
				Aristeus varidens	35.4
				Sergia sp	35.5
Middle Slope (550-1400 m) Sim: 52.1					
Nematocarcinus africanus	47.2	*Glyphus marsupialis*	38.5	*Acanthephyra pelagica*	99.0
Glyphus marsupialis	17.3	*Nematocarcinus africanus*	20.2	*Glyphus marsupialis*	93.3
Aristeus varidens	10.8	*Aristeus varidens*	12.9	*Aristeus varidens*	92.4
Others (61 spp)	24.7	Others (61 spp)	28.4	*Hymenopenaeus chacei*	92.4
				Stereomastis talismani	78.1
				Systellaspis debilis	74.3
				Heterocarpus grimaldii	54.3
				Sergia robusta	48.6
				Nematocarcinus africanus	45.7
				Pasiphaea multidentata	41.0
				Plesionika carinata	41.0
				Psathyrocaris fragilis	37.1
Deep Slope (1400-1825 m) Sim: 45.3					
Parapagurus pilosimanus	42.5	*Neolithodes asperrimus*	55.7	*Acanthephyra pelagica*	96.1
Hymenopenaeus chacei	9.8	*Pasiphaea tarda*	12.5	*Pasiphaea tarda*	72.5
Glyphus marsupialis	7.4	*Parapagurus pilosimanus*	8.7	*Benthesicymus bartletti*	64.7
Acanthephyra pelagica	7.0	Others (40 spp)	23.1	*Hymenopenaeus chacei*	64.7
Pasiphaea tarda	6.5			*Neolithodes asperrimus*	58.8
Others (38 spp)	26.8			*Stereomastis sculpta*	58.8
				Stereomastis nana	56.9
				Systellaspis debilis	47.1
				Acanthephyra eximia	39.2
				Glyphus marsupialis	39.2
				Stereomastis talismani	37.3

Table 12.7 Results of BIOENV analysis. Best matches of biotic and abiotic similarities matrices for each combination of variables (No). Depth, Longitude (Long), Latitude (Lat), Bottom Temperature (BT), %Mud, %Organic Matter (OM), and % carbonates (CO3). Spearman rank correlation (ρ)

No	Correlation	Best variables correlation
1	0.848	BT
2	0.848	BT, Long
2	0.826	BT, Lat
3	0.823	BT, Long, Lat
2	0.745	BT, OM
3	0.745	BT, Long, OM
3	0.741	BT, Lat, OM
4	0.740	BT, Long, Lat, OM
3	0.717	BT, Long, Depth
3	0.717	BT, Lat, Depth

Table 12.8 Mean values of ecological indices for the five decapod assemblages identified by the multivariate analysis: species richness (S), numerical abundance (N), biomass (B, in kg), Shannon-Wiener diversity index (H') and Pielou index (J') (abundance and biomass standarized to a 0.1 km^2 swept area). Acronyms of assemblages: Sh, Shelf; DSh-US, Deep shelf–Upper slope; DR, Deep Reef; MS, Middle Slope; DS, Deep Slope

Assemblage	S	N	B	H'	J'
Sh	30	122	0.5	1.4	0.29
DSh-US	50	1173	8.2	1.8	0.33
DR	41	2649	10.0	1.2	0.23
MS	64	753	6.4	2.6	0.44
DS	43	126	3.5	3.1	0.56

Fig. 12.1 Bathymetric and interquartile range of the 48 most representative decapod species inhabiting the Mauritanian deep shelf and continental slope

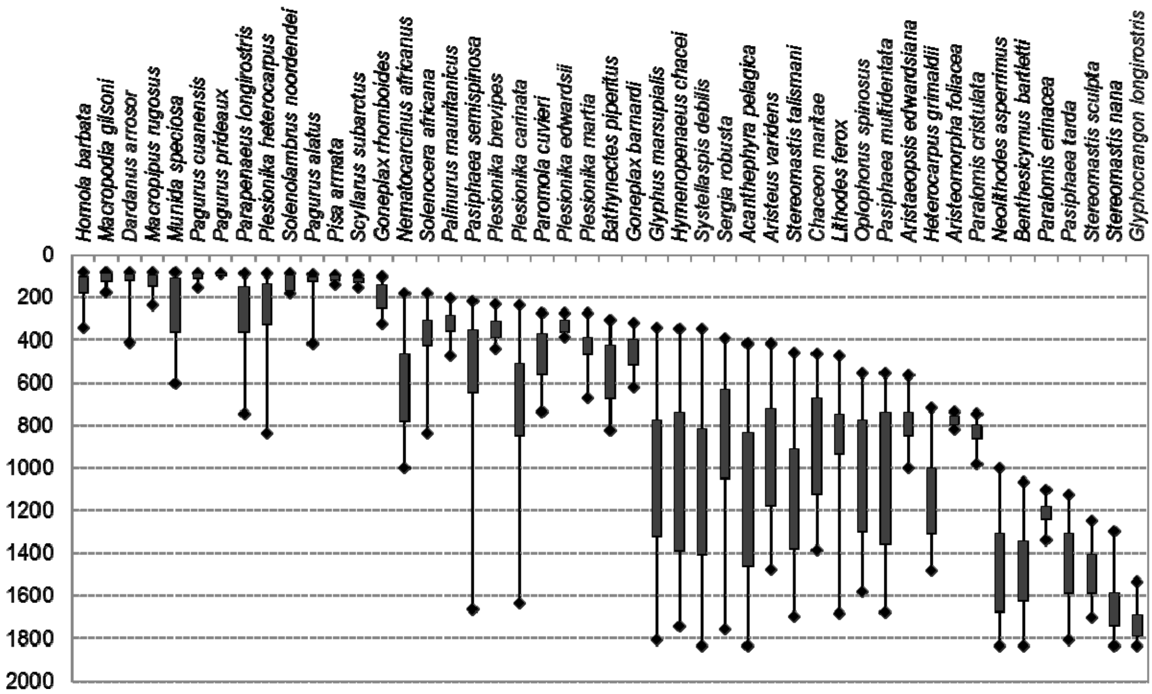


Fig. 12.2 Specific richness for the 24 main families of decapods in Mauritanian deep waters

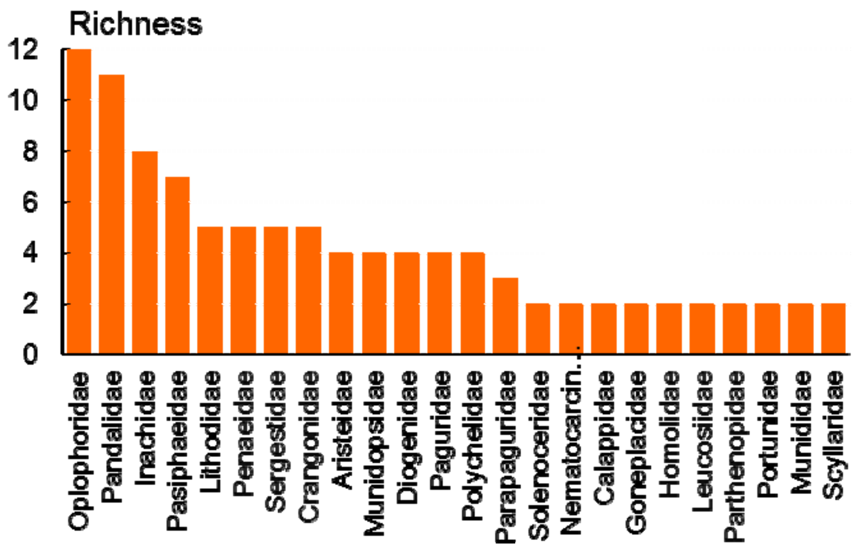


Fig. 12.3 Global composition, in (a) numerical abundances (N) and (b) biomass (B, in kg) standardized to 0.1 km2 (in %) of the main decapod families in Mauritanian deep-waters

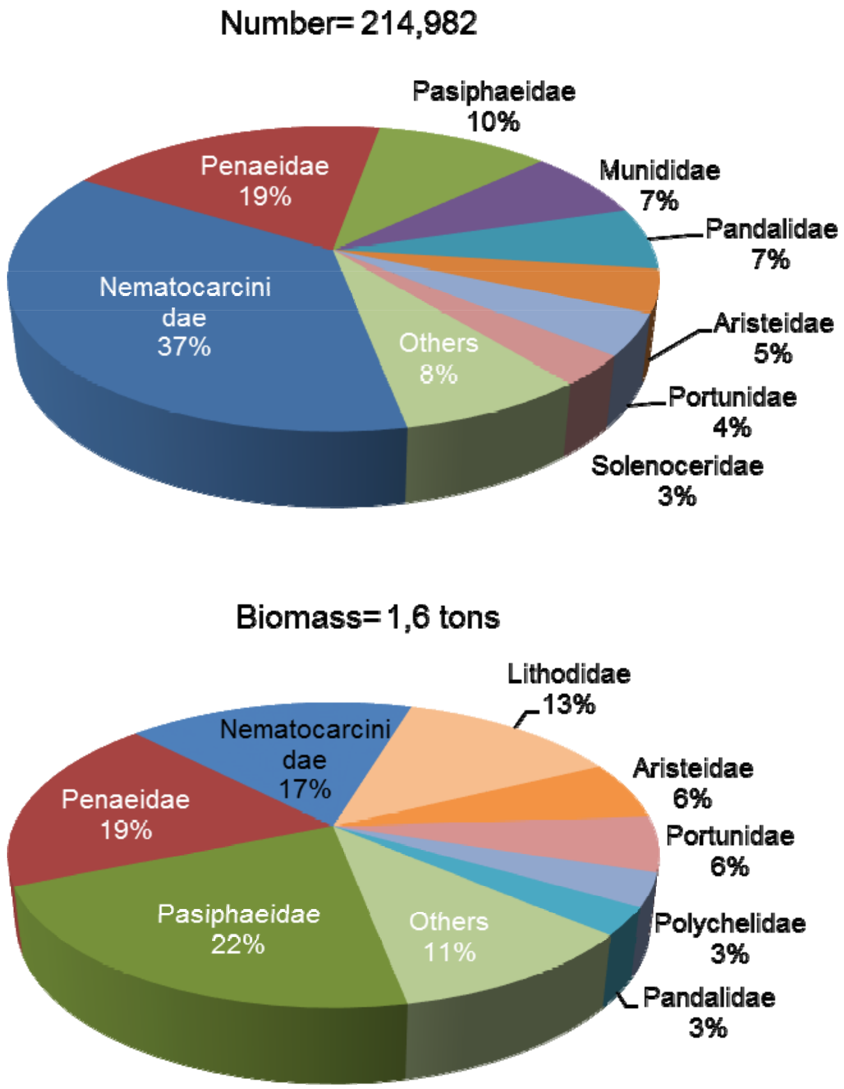
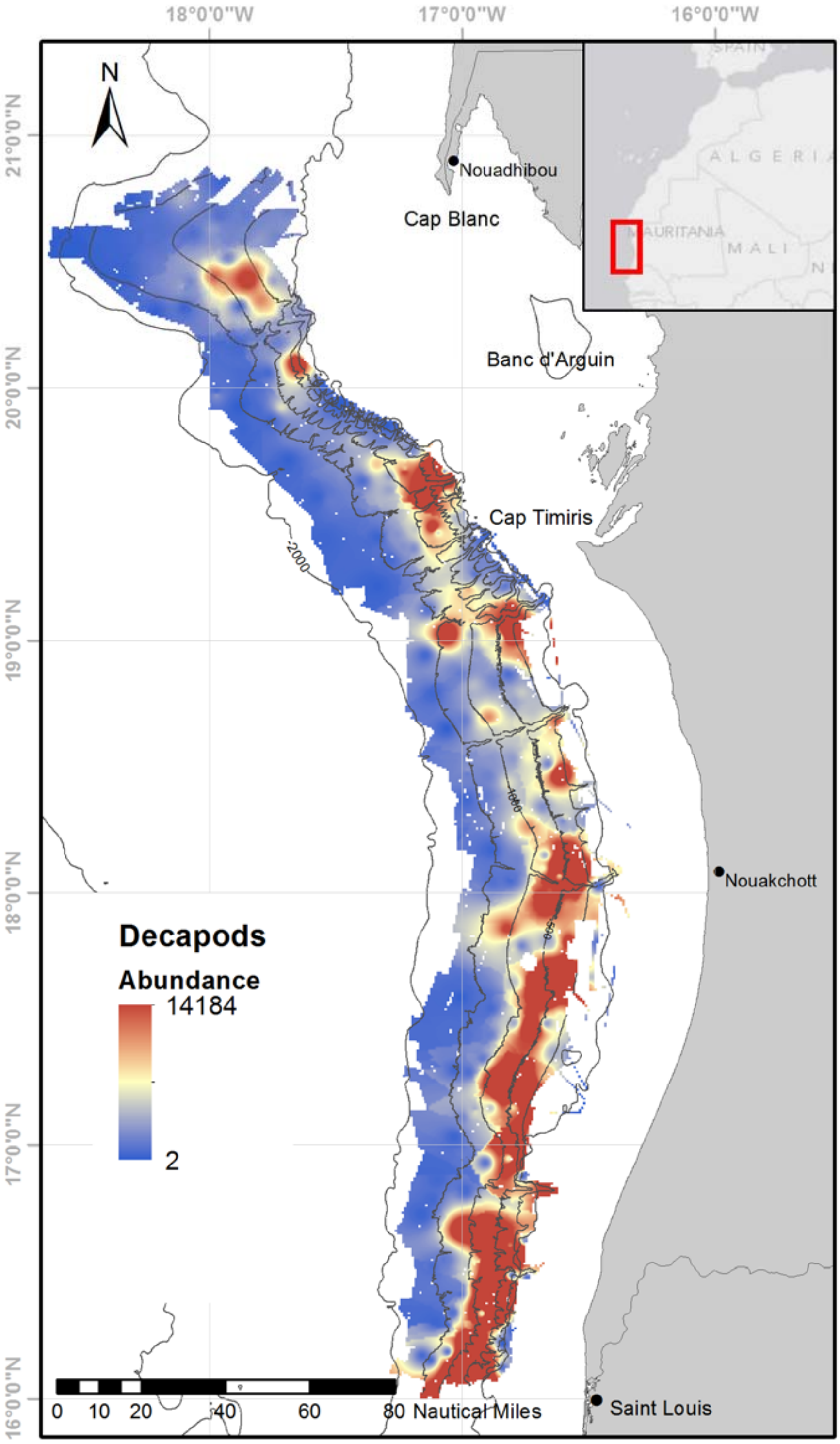
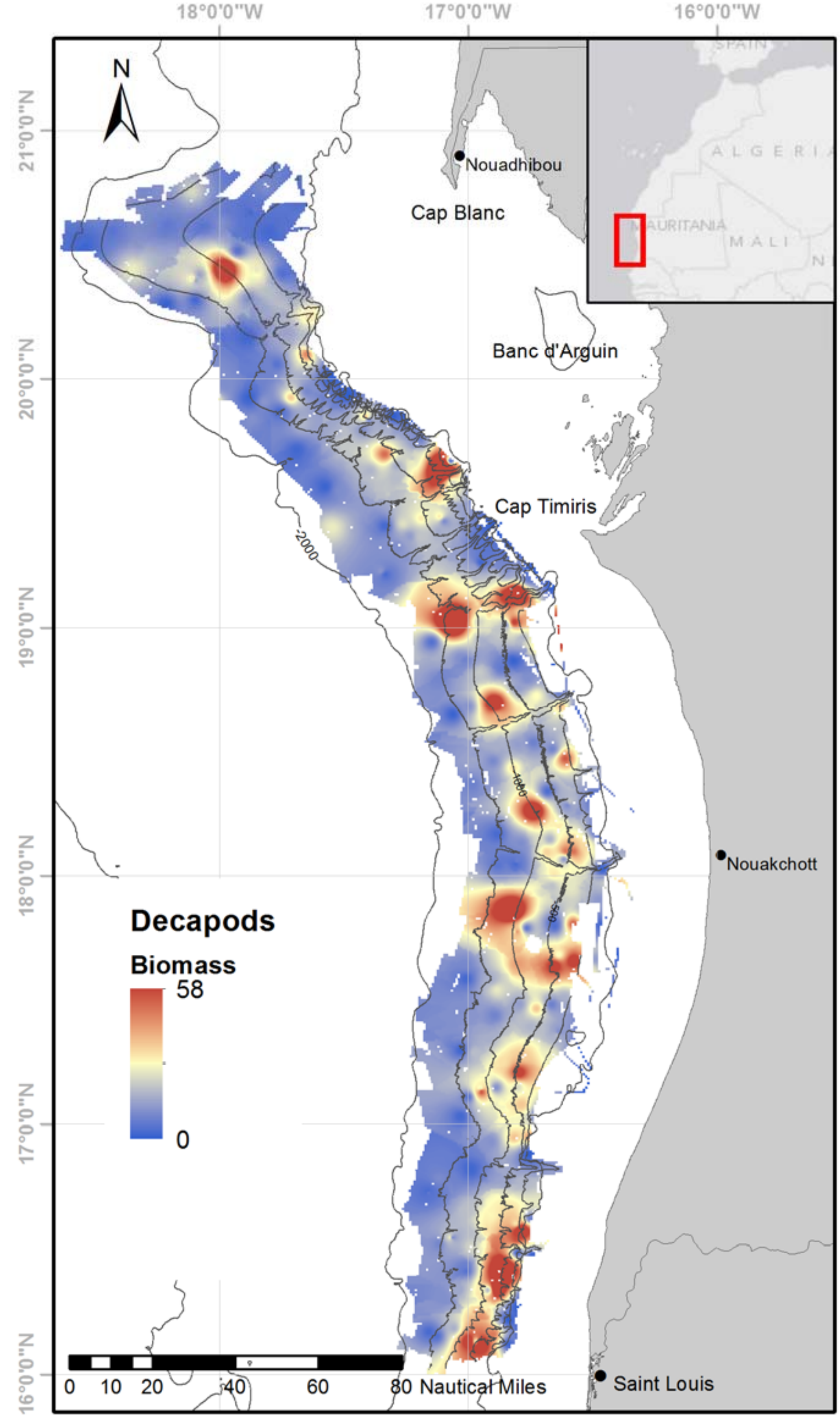


Fig. 12.4 a–c Geographical distribution by station of numerical abundances (N), biomass (B, in kg) and specific richness (S) (data standarized to a 0.1 km^2 swept area)

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16°0'0"N
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Nouadhibou
Cap Blanc
Banc d'Arguin
Cap Timiris
Nouakchott
Saint Louis
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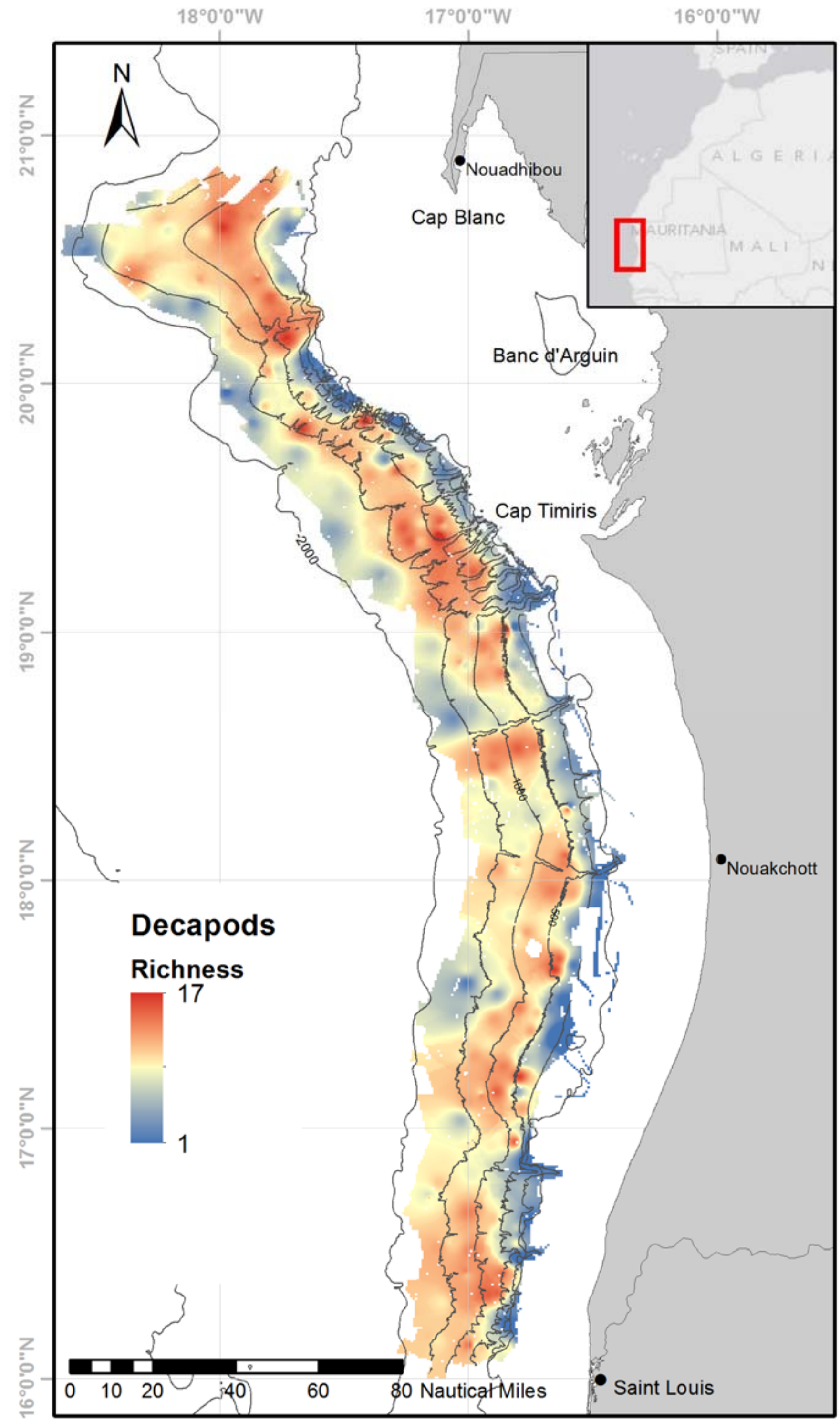
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17°0'0"N
16°0'0"N
N
Nouadhibou
Cap Blanc
Banc d'Arguin
Cap Timiris
Nouakchott
Saint Louis
SPAIN
ALGERIA
MAURITANIA
MALI
-2000
Decapods
Richness
17
1
0 10 20 40 60 80 Nautical Miles

Fig. 12.5 Two-dimensional multidimensional scaling (MDS) plot of the average abundance data of decapod crustaceans obtained during the *Maurit* surveys. ●Sh: Shelf; ♦DS-US: Deep Shelf – Upper Slope; ■DR: Deep Reef; ▲MS: Middle Slope; ▲DS: Deep Slope)

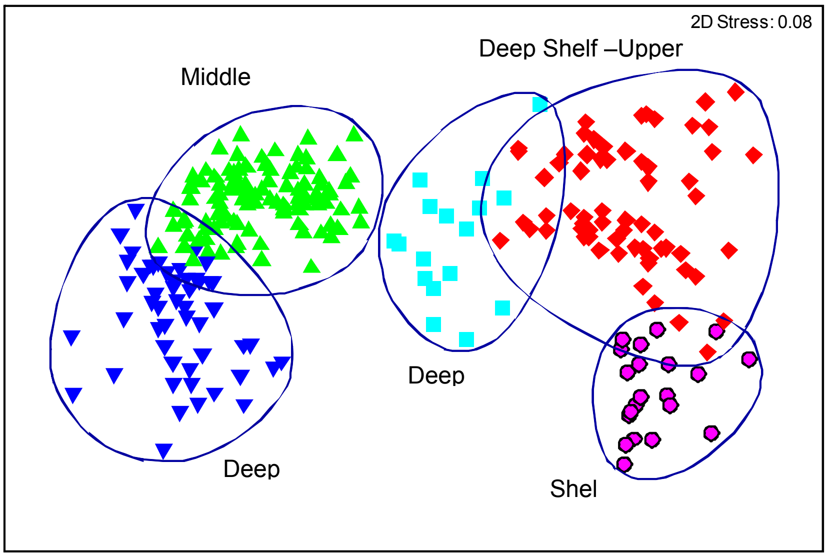


Fig. 12.6 Dendrogram resulting from multivariate analysis based on on densities matrix of decapods species (numerical abundances by station standardized to 0.1 km2 swept area, RR transformed data, Bray-Curtis similarity index

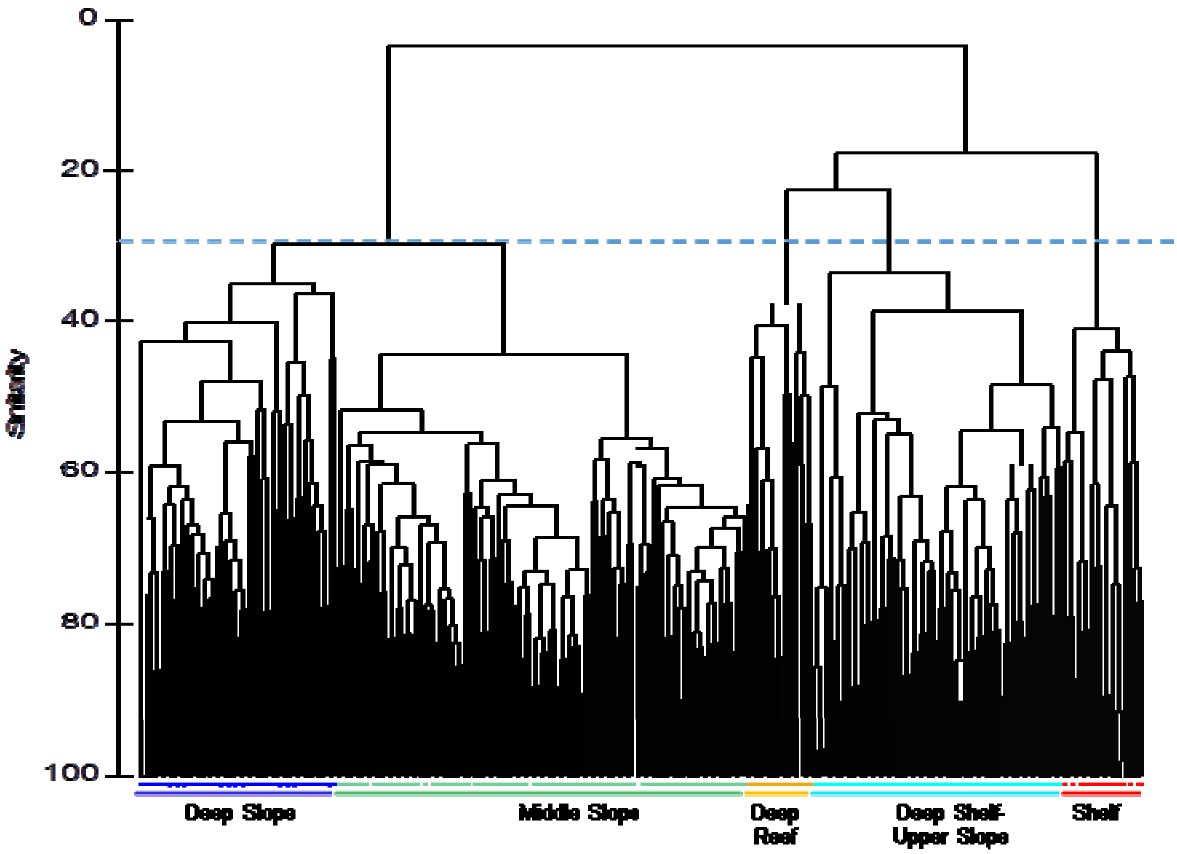
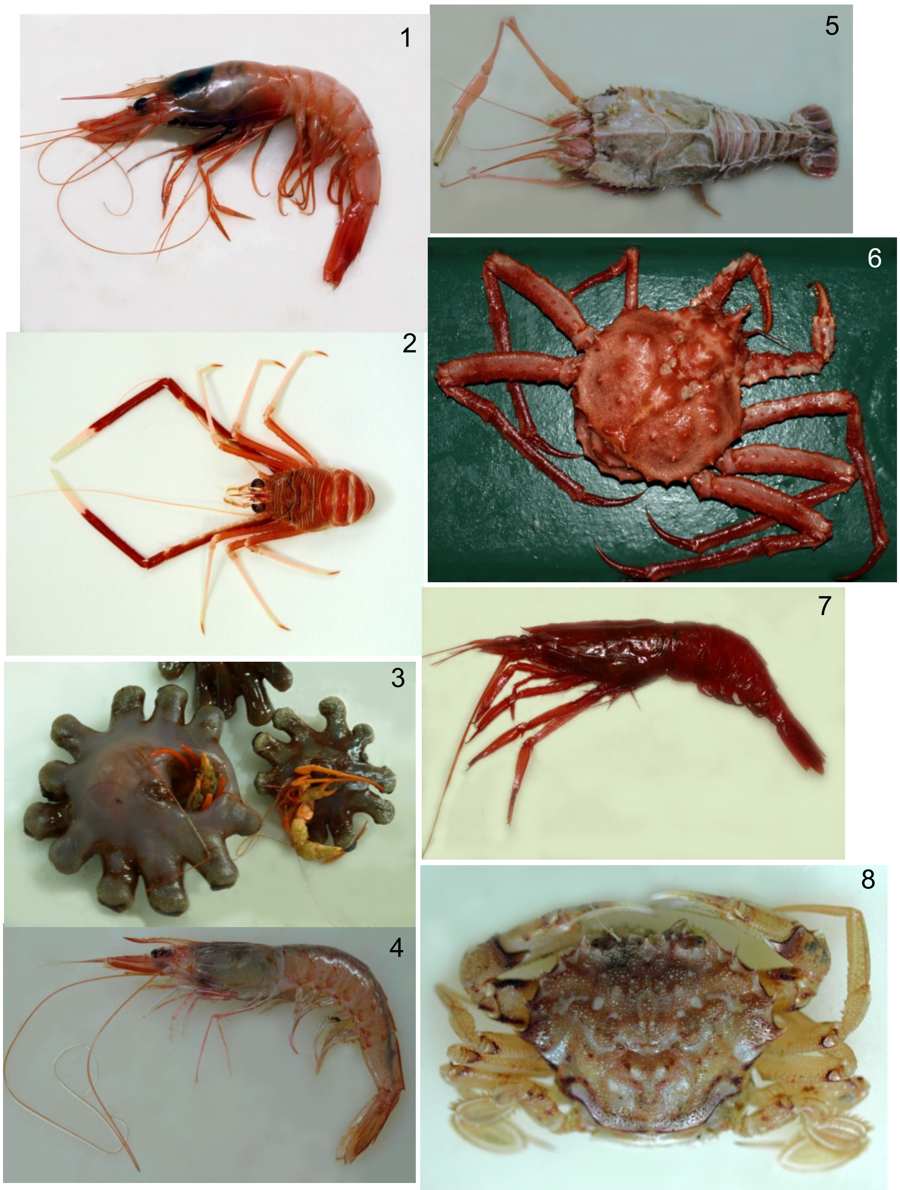


Fig. 12.7 Pictures of some of the most representative decapod species on the deep shelf and continental margin off Mauritania: *Aristeus varidens* (1), *Munida speciosa* (2), *Parapagurus pilosimanus* (3), *Parapenaeus longirostris* (4), *Stereomastis talismani* (5), *Lithodes ferox* (6), *Glyphus marsupialis* (7), *Macropipus rugosus* (8)



DISCUSIÓN

CONTEXTO GENERAL

El objetivo fundamental de esta tesis doctoral es el estudio de las colecciones de crustáceos decápodos recolectados en aguas profundas de la ZEE de Mauritania entre 2007 y 2010 durante las campañas *Maurit*.

La tesis está compuesta por seis artículos, de los cuales cinco son trabajos de tipo taxonómico: tres ya publicados, uno en edición y otro actualmente en proceso de evaluación. En el último trabajo, basado en la identificación de las especies y en el análisis de los datos cuantitativos de abundancia y biomasa recogidos durante las campañas, se aborda el estudio de las comunidades de decápodos de la zona.

Como han señalado diferentes autores (Cartes, 1998; Fanelli y Cartes, 2010; Boudreau y Worm, 2012; Torres 2013) los decápodos constituyen uno de los grupos de invertebrados más importantes en los ecosistemas bentónicos, tanto por su diversidad, abundancia y amplia distribución, como por su significativo papel en las cadenas alimentarias marinas, en las que son presa para numerosas especies de peces y predadores en un amplio rango de niveles tróficos. Así, los decápodos constituyen un taxón idóneo para el seguimiento de los cambios en la estructura y dinámica de los ecosistemas batiales (Cartes et al., 2007, 2014). Además, y como consecuencia del interés comercial que revisten muchas de las especies que se incluyen en este grupo, los decápodos son uno de los taxones más estudiados y mejor conocidos a nivel mundial (Martin y Davis, 2001).

En el noroeste de África, y a pesar del escaso conocimiento que existe actualmente sobre la fauna bentónica de aguas profundas a nivel regional (Decker et al., 2003), los decápodos son también el grupo más estudiado y mejor conocido. Así, durante la segunda mitad del siglo XX se publicaron importantes revisiones que siguen siendo hoy en día obras de referencia y de obligada consulta para los trabajos de identificación taxonómica de este grupo en la zona. Estos trabajos están basados en la revisión de una gran cantidad de especímenes depositados en diferentes museos, instituciones públicas y privadas, e incluso en colecciones particulares. El estudio comparado de colecciones procedentes de diferentes áreas geográficas permitió verificar la identificación de numerosas especies o grupos de especies cuyo estatus taxonómico era incierto, dando lugar en muchos casos a la descripción de especies nuevas para la ciencia.

Entre las revisiones más importantes caben destacar la de los braquiuros realizada por Monod (1956) y actualizada posteriormente por Manning y Holthuis (1981), que en conjunto aportan 34 especies nuevas para la ciencia; la revisión de los dendrobranquiados y carídeos llevada a cabo por Crosnier y Forest (1973), en la que se describen 24 nuevas especies; y la revisión de los galateidos de Miyake y Baba (1970), en la que se añaden 6 nuevas especies a las ya descritas en la región. A estas grandes revisiones hemos de añadir el conjunto de trabajos que Forest publicó entre 1952 y 1978, que aunque se refieren cada uno a zonas geográficas concretas (ver referencias en Matos-Pita y Ramil, 2015a), describen al menos 20 especies nuevas de cangrejos ermitaños para la costa occidental africana. Otros trabajos de menor entidad, pero que también incluyen descripciones de nuevas especies de decápodos son los de Saint-Laurent y Le Loeuff (1979), que describen 5 especies de talasanídeos de Senegal, Gambia y Golfo de Guinea; la publicación de Manning (1993) en la que se describen 9 especies nuevas de braquiuros, una de ellas de aguas de Mauritania; el trabajo de Fransen (1997), que incluye la descripción de una nueva especie de carídeo, también de Mauritania; la publicación de Muñoz y García-Isarch (2013) en la que se describe una nueva especie de litódido de las costas de Namibia; o el reciente trabajo de Sakai et al. (2015) en el que se describen 5 especies nuevas de talasanídeos de Mauritania.

La revisión de la bibliografía existente sobre decápodos evidencia que dentro del propio grupo los mayores esfuerzos científicos se han centrado en aquellos taxones que incluyen especies de interés comercial, que han sido estudiados de manera sistemática en las campañas de evaluación y prospección pesquera desarrolladas en África occidental desde principios del siglo XX. Sin embargo el conocimiento de otros grupos de decápodos, bien por carecer de interés comercial, bien por su menor relevancia desde el punto de vista de su diversidad y abundancia, es todavía escaso y fragmentario.

Este hecho se hizo claramente manifiesto al inicio de nuestro trabajo, de manera que la identificación de las colecciones de dendrobraquiados, carideos y macruros reptantes no presentó problemas relevantes y pudieron ser identificados sin dificultad. Todas las especies pertenecientes a estos taxones habían sido citadas previamente en aguas del oeste africano y muchas de ellas, sobre todo dendrobraquiados y carídeos, son especies de amplia distribución en el océano Atlántico, e incluso son conocidas en los océanos Índico y Pacífico (Crosnier y Forest, 1973; Pérez-Farfante y Kensley, 1997). Por el contrario, durante el estudio taxonómico del resto de los grupos: talasinídeos, anomuros y braquiuros, las dificultades para completar su estudio taxonómico en base a la bibliografía existente, se hicieron evidentes.

Como consecuencia de lo expuesto decidimos dedicar un mayor esfuerzo a la taxonomía de estos grupos, de forma que los resultados de su estudio constituyen la parte fundamental de la memoria de doctorado que aquí se presenta.

La investigación taxonómica y la descripción de especies nuevas requieren de un trabajo minucioso y la consulta de una ingente cantidad de publicaciones, algunas de las cuales pueden remontarse hasta casi dos siglos atrás. En algunos casos, sobre todo cuando se trabaja en la identificación de la fauna de aguas profundas, sólo se dispone de la descripción original basada en un único ejemplar, a veces incompleto. En publicaciones antiguas las descripciones consisten en una breve diagnosis que en la actualidad puede corresponder a varias especies afines descritas posteriormente. En estos casos se hace imprescindible el estudio del material tipo y la revisión de colecciones de comparación depositadas en diferentes museos e institutos de investigación.

Esta metodología de trabajo, la única que puede asegurar una identificación rigurosa de las especies, convierte a la taxonomía en una ciencia ‘lenta’ que requiere de tiempos muy largos antes de llegar a alcanzar los resultados deseados. Este hecho, unido a la dificultad de obtener financiación para el desarrollo de proyectos centrados en la taxonomía y de publicar los resultados en revistas científicas de alto impacto (Zhang, 2008), ha provocado en las últimas décadas una reducción importante de los investigadores que se dedican a esta disciplina (Zhang, 2008; Menot et al., 2010). Sin embargo, la importancia de la taxonomía como base para los estudios de biodiversidad, en particular de los ecosistemas profundos, en dónde aun la mayoría de las especies permanecen sin describir (Levin y Sibuet, 2012), ha sido destacada por diferentes autores (Martínez Arbizu y Brix, 2008; Zhang, 2008; Brökeland y George, 2009).

Las razones expuestas justifican plenamente nuestro trabajo y la presentación de esta memoria de doctorado.

ESTUDIO TAXONÓMICO

Uno de los principales escollos en la taxonomía de la fauna de aguas profundas está relacionado con las bajas abundancias y la distribución en ‘parches’ de las especies, de manera que muchas de ellas están representadas por un número muy bajo de individuos – en muchos casos un único ejemplar – lo que no constituye el escenario ideal para la descripción de nuevos taxa (Brökeland y George, 2009).

En este sentido, el elevado número de estaciones que se muestrearon en la plataforma y talud de Mauritania (329) y la utilización de diferentes artes de arrastre que permitieron la obtención de muestras, no sólo de los fondos blandos, sino también de los principales hábitats rocosos, nos proporcionó un número importante de ejemplares de muchas de las especies estudiadas. La amplitud de estas colecciones ha hecho posible solventar algunas de las carencias taxonómicas anteriormente mencionadas, permitiéndonos además de la descripción de nuevos taxa, aportar datos novedosos y completar las descripciones de especies ya conocidas.

En el conjunto de la Tesis se describen cuatro especies nuevas para la ciencia: el galateido *Munidopsis anaramosae* S. Matos-Pita & Ramil, 2014, el cangrejo ermitaño *Paguristes candelae* S. de Matos-Pita & Ramil, 2015a, el braquiuro *Neopilumnoplax corallicola* S. de Matos-Pita & Ramil, 2015b y el talasinídeo *Ezaxius ferachevali* S. de Matos-Pita & Ramil, 2015c, que en este caso incluye también la descripción del nuevo género *Ezaxius*.

Cabe destacar asimismo que el centenar de ejemplares del galateido *Munidopsis chunii* recolectado en aguas mauritanas nos ha permitido realizar una detallada descripción tanto de los machos como de las hembras de esta especie, así como describir e ilustrar su alta variabilidad morfológica (Matos-Pita y Ramil, 2014). La captura por primera vez desde su descripción original de un macho del talasanídeo *Callianassa oblonga* nos ha permitido aportar nuevos datos sobre la morfología de la especie y proponer su reasignación en el género *Trypaea* (Matos-Pita y Ramil, 2015c). También se describen por primera vez las hembras del cangrejo ermitaño *Pseudopaguristes marocanus* (Matos-Pita y Ramil, 2015a) y del talasinídeo *Trypaea oblonga* n. comb., que eran desconocidas hasta el momento (Matos-Pita y Ramil, 2015c). Por último, gracias a la gran cantidad de material examinado ha sido posible describir variaciones morfológicas no referidas anteriormente en la bibliografía que aportan nuevos datos sobre la variabilidad intraespecífica de algunas especies; algunos ejemplos de este tipo de variaciones los encontramos en el ermitaño *Diogenes pugilator* (Matos-Pita y Ramil, 2015a), en el talasinídeo *Calocarides coronatus* (Matos-Pita y Ramil, 2015c) y en el braquiuro *Cymonomus granulatus* (Matos-Pita et al., en evaluación).

Para solventar algunos problemas taxonómicos surgidos durante el proceso de identificación de algunas especies hemos tenido que recurrir a la revisión del material tipo o de colecciones de referencia. Así, el examen del holotipo y ejemplares adicionales del cangrejo ermitaño *Paguristes mauritanicus*, depositados en el Museo de Historia Natural de Paris, puso en evidencia la incorrecta descripción de uno de los apéndices abdominales; su redescripción nos permitió incluir en esta especie algunos de los ermitaños de nuestra colección y su reasignación al género *Areopaguristes* (Matos-Pita y Ramil, 2015a). Igualmente se ha revisado el material tipo de *Paguristes marocanus*, depositado también en el Museo de Historia Natural de París, y tras comprobar que al igual que nuestros ejemplares solamente presentaban 8 pares de branquias funcionales, se propuso su inclusión en el género *Pseudopaguristes* (Matos-Pita y Ramil, 2015a).

En el caso de los braquiuros, ante las dudas que se plantearon con la identificación del material perteneciente al género *Monodaeus*, también hemos recurrido al estudio de material de comparación. Se han revisado ejemplares de *Monodaeus couchii* procedentes del Mar Mediterráneo, Golfo de Cádiz y costas atlánticas de Marruecos, y de *Monodaeus cristulatus* recogidos en las costas de Namibia (Colección de Referencia del Instituto de Ciencias del Mar-CSIC, Barcelona y Colección de Crustáceos Decápodos y Estomatópodos del Centro Oceanográfico de Cádiz, CCDE-IEOCD). Este estudio comparativo ha permitido la asignación de nuestros ejemplares a la especie *M. cristulatus*, que previamente sólo había sido citada en Namibia (Matos-Pita et al., en evaluación). De la misma forma, ante la posible confusión entre *Inachus grallator* e *Inachus dorsetensis*, ambas citadas en el noroeste de África y muy similares entre sí, hemos recurrido a la revisión de material de *I. dorsetensis* procedente de las costas de Galicia (Colección del Laboratorio de Zoología Marina de la Universidad de Vigo), lo que nos ha permitido establecer claramente las diferencias entre ambas especies y asignar nuestros ejemplares a *I. grallator*.

DIVERSIDAD

El estudio de los decápodos recogidos en las 329 estaciones muestreadas a lo largo de toda la costa mauritana entre 80 y 2000 m de profundidad nos han permitido identificar un total de 132 especies.

A pesar de que las comparaciones entre los resultados obtenidos en distintas zonas resultan problemáticas por las diferentes metodologías de trabajo y los rangos batimétricos considerados en cada caso, García-Isarch et al. (en edición) señalan que la diversidad de decápodos en Mauritania es más elevada que la obtenida en otras zonas del Atlántico y del Mar Mediterráneo, aunque presenta valores similares a los obtenidos por Muñoz et al. (2012) en aguas de Guinea Bissau (122 especies).

Sin embargo, si incluimos los datos de Monod (1933), que cita 72 especies recogidas entre la zona litoral y los 1000 m de profundidad, y los aportados por Fransen (1991), que registra la presencia de 108 especies entre 0 y 1900 metros, junto con las referencias obtenidas tras una exhaustiva revisión bibliográfica, el inventario de los decápodos de Mauritania se aproxima a las 300 especies (273 – 296). Teniendo en cuenta estos datos, la diversidad de los decápodos en Mauritania supera la registrada para todo el noroeste de África por García-Isarch y Muñoz (2015), que en su revisión de los decápodos de la región del CCLME (estrecho de Gibraltar – Guinea Conakry) citan 228 especies entre 20 y 2000 metros de profundidad.

La riqueza de las comunidades bentónicas en esta zona, ligada a las condiciones de afloramiento permanente en la zona de Cabo Blanco y a la elevada productividad de sus aguas, ha sido destacada por diferentes autores (Bonnet et al., 1971; Thiel, 1982; Le Loeuff y von Cosel, 1998; Ramos et al., 2015). Además, la situación de Mauritania en la frontera entre la provincia Lusitánica y la provincia Atlántico oriental-Tropical (Briggs, 1995; Briggs y Bowen, 2012) la convierte en una zona de cambio entre la fauna típica de las regiones templada y tropical, lo cual se refleja en su elevada diversidad, resultado de la mezcla de especies propias de ambas regiones biogeográficas (Le Loeuff y von Cosel, 1998; van Soest, 1993; Ramos et al., 2015).

Nuestros resultados coinciden en destacar la importancia de los componentes tropicales y templados antes mencionados. Así, el 45% de las especies muestra claras afinidades tropicales, con una distribución geográfica restringida al oeste africano, mientras que el 23% son especies de afinidad lusitánica o incluso boreal, cuya distribución incluye el Atlántico europeo y las costas africanas. Los demás componentes faunísticos presentes en Mauritania están representados por especies de amplia distribución (Atlántico, Índico, Pacífico; 21%) y especies de distribución anfi-atlántica (11%).

Estos resultados contrastan con los obtenidos en estudios previos basados en grupos sésiles o semi-sésiles: briozoos (Arístegui y Cruz, 1986), poríferos (van Soest, 1993), hidroideos (Ansín Agís et al., 2001; Gil y Ramil, en edición), equinodermos (Hernández et al., 2013; Calero et al., en edición), que destacan la importancia de las especies Atlántico-Mediterráneas frente a las tropicales, que en todos los grupos mencionados constituyeron un componente minoritario en la región. Asimismo, todos ellos coinciden en destacar la importancia de la Corriente de Canarias como vía de dispersión larvaria hacia el sur que explicaría la aparición de especies de aguas templadas en el noroeste de África. Por el contrario, la presencia de especies tropicales parece más difícil de explicar y algunos autores (Arístegui y Cruz, 1986; Hernández et al., 2013) consideran que el régimen de corrientes dominante en la zona impide la dispersión hacia el norte de la fauna bentónica.

Sin embargo, estas restricciones parecen no afectar a los decápodos ya que el componente mayoritario está representado por especies de afinidades tropicales. En este caso, quizás la capacidad de movimiento de los adultos, ligada al desplazamiento del frente térmico que se produce estacionalmente entre Cabo Blanco y Cabo Verga (Le Loeuff y von Cossel, 1998; Pelegrí y Peña-Izquierdo, 2015) puede favorecer su dispersión septentrional. Por otra parte las corrientes menores que fluyen hacia el norte, como son la corriente superficial a lo largo de Gabón y Congo, la corriente de Mauritania que se produce en verano y otoño entre Cabo Verde y Cabo Blanco (Stramma y Schott, 1999; Pastor et al., 2008) o la corriente que a nivel del talud continental y a lo largo de toda la región del CCLME fluye hacia el polo (Pelegrí y Benazzouz, 2015) puedan también constituir una vía de dispersión hacia el norte para las larvas de decápodos, aunque no para otros grupos.

Finalmente queremos destacar que las especies de amplia distribución (ampliamente distribuidas en el océano Atlántico, pero que también están presentes en el Océano Índico y/o Pacífico) constituyen la proporción más importante en el caso de los dendrobraquiados y carídeos, hecho quizás ligado a su capacidad de natación y a su modo de vida bento-pelágico. En el resto de los grupos este componente es minoritario o está ausente y la mayoría de las especies presentan sus distribuciones limitadas al Atlántico oriental. La única excepción la constituyen los representantes del infraorden Polychelida ya que de las cuatro especies recolectadas, tres de ellas, *Polycheles typhlops*, *Stereomastis nana* y *Stereomastis sculpta*, han sido citadas en los tres océanos y solamente *Stereomastis talismani* presenta su distribución geográfica restringida al oeste africano, entre el Sáhara Occidental y Angola.

LAS COMUNIDADES DE DECÁPODOS

Como ya indicamos anteriormente los decápodos constituyen uno de los grupos mejor estudiados a nivel mundial, pero a pesar de ello los trabajos publicados hasta la fecha sobre la estructura y composición de las comunidades de este grupo y los factores que determinan su distribución son escasos, en particular en aguas profundas.

En general la zonación de las comunidades bentónicas a lo largo del gradiente batimétrico parecen determinadas más que por la profundidad *per se*, por la combinación de una serie de variables dependientes de ella (luz, temperatura, presión, disponibilidad de alimento o turbidez), que afectan directamente a la biología y fisiología de los organismos marinos y a las interacciones ecológicas entre los taxa (Rex, 1976; Rowe, 1981; Carney, 2005). Esto ha sido observado en diferentes áreas del Atlántico y del Mediterráneo (Lleonart y Roel, 1984; Abelló et al., 1988; Cartes y Sardà, 1992; Macpherson, 1991; Fariña, 1997; Company et al., 2004; Fanelli et al., 2007, 2013; Follesa et al., 2009; Muñoz et al., 2012; Papiol et al., 2012; Cartes et al., 2014).

En el caso de las costas occidentales de África, aunque los resultados de las expediciones de la *Thalassa* ya ofrecían información sobre la fauna de decápodos y cartografiaron y describieron las principales biocenosis bentónicas de Marruecos, Sáhara Occidental y Mauritania (Maurin, 1968; Bonnet et al., 1971), sólo existen estudios previos específicos sobre las comunidades de decápodos en aguas de Guinea Bissau (Muñoz et al., 2012) y Namibia (Mcpherson, 1991). Otros trabajos realizados en Namibia, Angola, Congo y Gabón analizan las comunidades demersales en su conjunto, incluyendo peces y crustáceos (Lleonart y Roel, 1984; Bianchi, 1992a, b).

La estructura de las cinco comunidades de decápodos identificadas en aguas de la plataforma y talud de Mauritania (dos más costeras y tres profundas) parecen determinadas básicamente por la temperatura y el contenido en materia orgánica, dos variables físicas dependientes de la profundidad, y en menor medida por la latitud. Algunos autores han sugerido que la temperatura constituye el factor determinante en la zonación de las comunidades profundas (Gage y Tyler 1991), mientras que el contenido en materia orgánica ha sido identificado por otros como el factor dominante en la distribución de las comunidades de decápodos en aguas profundas (Cartes et al., 2007).

Sin embargo, a lo largo del talud de Mauritania, además de las variables dependientes de la profundidad, actúan otros factores que no sólo determinan la zonación y marcan unas claras fronteras en la composición faunística (a 100, 400, 550 y 1400 m), sino que son responsables de los patrones de distribución de las abundancias, biomasas y diversidad. De manera general las abundancias y biomasas de decápodos aumentan con la profundidad, desde los valores mínimos de la plataforma hasta la profundidad de 400-550 m, en la que se observa un fuerte pico. A partir de 550 m, abundancias y biomasas presentan la típica disminución progresiva que se observa en el bentos profundo asociada a la baja disponibilidad de alimento en el fondo marino (Haedrich et al., 1980; Rowe, 1983; Cartes y Sardà, 1992; Company et al., 2004; Politou et al., 2005; Cartes et al., 2007; McClain et al., 2008; Follesa et al., 2009; Fanelli et al., 2013).

La diversidad de los decápodos en el talud de Mauritania muestra, en cambio, un patrón totalmente diferente, de forma que se va incrementando progresivamente con la profundidad, y alcanza sus máximos valores en el talud profundo, entre 1400 y 1825 m, si bien esta tendencia se ve interrumpida entre 400 y 550 m. Aunque de manera general macrofauna, megafauna y peces demersales muestran un máximo de diversidad en el talud intermedio (1000-2500 m) en el Atlántico noroccidental (Rex 1983; Levin and Sibuet 2012), este incremento de la diversidad de los decápodos con la profundidad es inusual y hasta ahora solo se había observado en algunas áreas del Mediterráneo (Follesa et al. 2009).

Los patrones batimétricos se reflejan claramente en la estructura de las comunidades: las agrupaciones de la plataforma, talud superior y, en particular la del arrecife (en conjunto la banda batimétrica comprendida entre 100 y 550 m), están caracterizadas por bajos índices de diversidad y fuertes dominancias de una única especie; por el contrario, en las dos comunidades profundas (550-2000 m) diversidad y equitatividad son más elevadas.

Así, la comunidad de la plataforma (80–100 m) se caracteriza por la fuerte dominancia del galateido *Munida speciosa*, que aunque en Mauritania alcanza los 600 m de profundidad, no contribuye de manera significativa a las comunidades del talud. *Munida speciosa* es el principal indicador en las asociaciones del talud (200-400 m) en Guinea-Bissau (Muñoz et al., 2012) y Namibia (Macpherson, 1991), pero semejantes dominancias no habían sido citadas hasta ahora a profundidades similares. Aunque Maurin (1968) describió estas biocenosis en el Banco de Arguin en idéntico rango de profundidad (90-100 m), este autor no menciona que la abundancia de *M. speciosa* fuese especialmente relevante.

La comunidad de la plataforma profunda y talud superior (100–450 m) está también caracterizada por la dominancia de otra única especie, la gamba blanca *Parapenaeus longirostris*, que ha sido citada en idéntico rango de profundidad en aguas de Guinea-Bissau (Muñoz et al., 2012), Congo y Gabón (Bianchi, 1992a), Angola (Bianchi, 1992b) y Namibia (Macpherson, 1991). *Parapenaeus longirostris* ha sido la especie de decápodo más importante en términos de biomasa a lo largo de las campañas *Maurit* y constituye la principal especie objetivo de la flota marisquera española que faena en aguas de Mauritania. Otras dos especies que también están bien representadas en esta comunidad, *Plesionika heterocarpus* y *Munida speciosa*, constituyen igualmente una parte importante de los descartes producidos por esta flota (García-Isarch, Instituto Español de Oceanografía, datos sin publicar, 2011, 2012). Aunque la contribución de las especies muestra algunas diferencias, la composición específica de esta comunidad es bastante similar a la que Muñoz et al. (2012) ha identificado en aguas de Guinea-Bissau entre 200 y 300 m de profundidad, presentando además ciertas similitudes con la comunidad de decápodos descrita por Macpherson (1991) en el talud de la zona norte de Namibia.

La comunidad del arrecife es sin duda la más interesante desde el punto de vista ecológico, ya que no deja de sorprender que las mayores concentraciones de decápodos se correspondan con los más bajos valores de diversidad y se encuentren a profundidades que coinciden con los mínimos de oxígeno (1.0–1.3 mL entre 300 y 550 m) y con la presencia de la barrera de coral, que se extiende a lo largo de prácticamente toda la costa mauritana, desde cabo Timiris hasta la frontera con Senegal (Ramos et al., en edición; Meiners y Presas, en evaluación). La coincidencia de las más altas biomasas de decápodos con las zonas de valores mínimos de oxígeno y máxima turbidez cerca del fondo también ha sido observada en el Mediterráneo por Fanelli et al. (2013), pero en este caso, al contrario que en el talud de Mauritania, coincide con la máxima diversidad.

Aunque la comunidad del arrecife está tipificada por varias especies (*Pasiphaea semispinosa, Solenocera africana* y *Plesionika carinata*) y tiene una composición semejante a la descrita en Guinea-Bissau entre 300 y 500 m (Muñoz et al., 2012), la especie más importante en términos de abundancia y biomasa es *Nematocacinus africanus*. Esta especie también es un indicador de la comunidad del talud a 300–400 m en aguas del Congo, Gabón y Angola (Bianchi, 1992a,b). Sin embargo en ninguna de las zonas citadas la dominancia puede atribuirse a esta especie en exclusiva. Probablemente *N. africanus* sea menos sensible a las condiciones adversas que conlleva las bajas concentraciones de oxígeno, sacando partido ecológico a esta capacidad que le permitiría reducir la competencia por el espacio y el alimento con especies mucho más sensibles. La capacidad de algunos decápodos de vivir en aguas poco oxigenadas, en particular especies de aguas profundas incluidas en los géneros *Solenocera*, *Nematocarcinus* y *Plesionika,* se ha observado en el Pacífico mexicano (Hendrickx y Serrano 2010).

Es indudable que la coincidencia de la estructura gigante del arrecife de corales de aguas profundas con la zona de los mínimos valores de oxígeno entre 400 y 550 m de profundidad, representan una barrera ecológica determinante para la dispersión de las especies de la plataforma, la zonación del bentos y el remplazo de especies (‘turnover’) a lo largo del talud de Mauritania, como han sugerido algunos autores (Hendrickx, 2001; Carney, 2005; Sellanes et al., 2010). Macpherson (1991) ha relacionado los bajos niveles de oxígeno en el fondo marino con la zonación de las comunidades de decápodos en aguas de Namibia.

Las comunidades que se extienden más allá de la barrera muestran, además de una composición faunística diferente, una mayor diversidad y equitatividad pero abundancias y biomasas inferiores. Así, tanto la comunidad del talud intermedio como la del talud profundo, están caracterizadas no por una única, sino por un conjunto de especies. En la primera cuatro especies, *Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis* e *Hymenopenaeus chacei* son las especies principales, seguidas por *Stereomastis talismani, Systellaspis debilis, Nematocarcinus africanus,* *Heterocarpus grimaldii* y *Sergia robusta*. Aunque la estructura de las agrupaciones de Guinea-Bissau (Muñoz et al., 2012) y Namibia (Macpherson, 1991) a profundidades similares son bastante diferentes de las de Mauritania, algunas especies son componentes comunes en las tres áreas. Hay que destacar que *A. varidens* es la tercera especie en importancia en los desembarcos de la flota marisquera de la Unión Europea que faena en Mauritania (García-Isarch, Instituto Español de Oceanografía, datos sin publicar, 2011, 2012).

Por su lado, las especies de decápodos que tipifican la comunidad del talud profundo de Mauritania, pertenecientes a la supefamilia Oplophoridae (*A. pelagica, Systellaspis debilis*), y a las familias Pasiphaedae (*Pasiphaea tarda, G. marsupialis*), Polychelidae (*Stereomastis nana, Stereomastis sculpta*) y Lithodidae (*Neolithodes asperrimus*), son también las más representativas en otras regiones del Atlántico (Banco de Galicia) (Cartes et al., 2014) y del Mediterráneo (Cartes y Sardà, 1993; Maynou y Cartes, 2000). Cartes (1993) ha sugerido que estas afinidades entre familias, géneros e incluso especies de decápodos de zonas tan lejanas pueden ser consecuencia del origen común de la fauna de aguas profundas.

El conocimiento de las comunidades bentónicas, su dinámica y los factores que determinan su distribución permiten identificar ecosistemas marinos potencialmente vulnerables, cuya explotación debe regularse con el objetivo de planificar una pesca responsable y la gestión duradera de los recursos vivos (Ramos et al., 2015). El conocimiento del bentos y de las especies que lo habitan se hace pues imprescindible, no solamente desde un punto de vista taxonómico o sistemático como el expuesto anteriormente, sino también desde un punto de vista biológico y ecológico. Los resultados obtenidos en este estudio, aparte de contribuir a la caracterización y el conocimiento de los ecosistemas bentónicos de aguas profundas, pueden servir de base o punto de referencia a escala temporal para evaluar la degradación o recuperación de los fondos de la plataforma profunda y talud continental de Mauritania en trabajos posteriores.

CONCLUSIONES

- Se identifican un total de 132 especies de crustáceos decápodos pertenecientes a 49 familias, de las cuales Pandalidae, Inachidae y Pasipaeidae han sido las mejor representadas con 10, 9 y 7 especies respectivamente. Acanthephyridae y Crangonidae están representadas por 6 especies cada una, seguidas de Diogenidae, Lithodidae, Munidopsidae, Paguridae y Penaeidae con 5 especies; Aristeidae, Munididae, Oplophoridae, Polychelidae y Sergestidae con 4 y Parapaguridae y Parthenopidae con 3 especies; once familias han estado representadas por 2 especies y otras 21, únicamente por una especie.

- Se describen cinco nuevos taxa para la ciencia: un género y una especie de talasanídeo, *Ezaxius ferachevali*, el ermitaño *Paguristes candelae*, el galateido *Munidopsis anaramosae* y el braquiuro *Neopilumnoplax corallicola*.

- Se reasignan a otros géneros tres especies: los ermitaños *Paguristes mauritanicus* y *Paguristes marocanus*, a los géneros *Areopaguristes* Rahayu & McLaughlin, 2010 y *Pseudopaguristes* McLaughlin, 2002 respectivamente, y el talasinídeo *Callianassa oblonga* al género *Trypaea* Dana, 1852.

- Se describen por primera vez las hembras de dos especies: el ermitaño *Pseudopaguristes marocanus* y el talasinídeo *Trypaea oblonga*.

- Se redescribe el galateido *Munidopsis chunii*, incluyendo un detallado estudio de su variabilidad intraespecífica.

- Se aportan nuevos datos sobre la morfología de cuatro especies: el ermitaño *Diogenes pugilator*, los talasanídeos *Calocarides coronatus* y *Trypaea oblonga* n. comb., y el braquiuro *Cymonomus granulatus*.

- Se citan por primera vez desde su descripción original un total de cuatro especies: *Galathea wolffi*, *Munidopsis vaillanti*, *Monodaeus cristulatus* y *Trypaea oblonga* n. comb.

- Se amplía la distribución geográfica de 18 especies, para 16 de ellas (*Ethusa rugulosa*, *Galathea wolffi*, *Inachus grallator*, *Macropodia gilsoni*, *Macropodia hesperiae*, *Monodaeus cristulatus*, *Munidopsis chunii*, *Munida guineae*, *Munida speciosa*, *Paragiopagurus macroceros*, *Paralomis cristulata*, *Pseudopagurus marocanus*, *Pseudomyra mbizi*, *Solenolambrus noordendei*, *Spinolambrus notialis* y *Trypaea oblonga* n. comb.) hacia el norte y para dos (*Munida sanctipauli* y *Munidopsis vaillanti*) hacia el sur.

- Se amplía la distribución batimétrica de 17 especies: *Acanthocarpus brevispinis*, *Areopaguristes mauritanicus*, *Ethusa rugulosa*, *Inachus aguiarii*, *Inachus grallator*, *Inachus nanus*, *Liocarcinus corrugatus*, *Macropodia macrocheles*, *Monodaeus cristulatus*, *Munidopsis chunii*, *Paragiopagurus macroceros*, *Paralomis cristulata*, *Pseudopaguristes marocanus*, *Spinolambrus notialis*, *Solenolambrus noordendei* y *Trypaea oblonga* n. comb. y *Munidopsis vaillanti*.

- Se aportan datos biológicos (biometrías, sexo, presencia de hembras ovadas y fauna epibionte cuando procede) y ecológicos (tipo de fondo, profundidad) y se revisan las distribuciones geográfica y batimétrica generales.

- Se tipifican la estructura y composición de las comunidades de decápodos de fondos blandos de la plataforma profunda y el talud de Mauritania y se analizan los posibles factores responsables de su distribución.

- Se definen cinco asociaciones de decápodos en aguas profundas de Mauritania: plataforma (<100 m), plataforma profunda y talud superior (100– 400 m), arrecife (400– 550 m), talud medio (550– 1400 m) y talud profundo (1400– 1800 m).

- Variables dependientes de la profundidad, como la temperatura en el fondo y el contenido en materia orgánica, junto con la latitud, parecen ser los principales factores que estructuran estas asociaciones, si bien la presencia del arrecife gigante de corales de aguas frías y la zona de mínimos valores de oxígeno marcan una frontera que separa las comunidades de la plataforma y talud superior de las de aguas más profundas a lo largo de las costas mauritanas.

- Las tres comunidades de la plataforma y talud superior se caracterizan por la fuerte dominancia de una única especie, *Munida speciosa*, *Parapenaeus longirostris* y *Nematocarcinus africanus*, respectivamente. Las comunidades profundas por su parte, están tipificadas por un número que oscila entre 9 y 10 especies y presenta mayores valores de diversidad y equitatividad.

- El análisis de las distribuciones geográficas nos ha permitido establecer los contingentes biogeográficos de la fauna de decápodos en el área de estudio, que aparece dominada por especies de afinidad tropical, cuya distribución se limita a la costa occidental de África.

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ANEXO

Tabla con los datos relativos a las estaciones muestreadas duante las campañas 'Maurit' que incluye las coordenadas y profundidades de inicio y fin, la naturaleza del sustrato y las especies de decápodos capturados.

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	1	MU01	17/11/2007	20º46´60" 17º47´44"	20º45´54" 17º49´51"	817–820	Arena Fangosa	*Acanthephyra pelagica, Aristaeomorpha foliacea, Aristaeopsis edwardsiana, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Paralomis cristulata, Pasiphaea multidentata, Systellaspis debilis*
Maurit-1107	2	MU02	17/11/2007	20º42´00" 17º50´30"	20º40´01" 17º53´04"	616–626	Arena Fangosa	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Hymenopenaeus chacei, Lithodes ferox, Metacrangon bellmarleyi, Pasiphaea multidentata, Pasiphaea semispinosa, Plesionika* sp, *Sergia robusta, Systellaspis debilis*
Maurit-1107	3	MU03	17/11/2007	20º48´13" 17º58´17"	20º49´53" 17º55´60"	1267–1243	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea semispinosa, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	4	MU04	18/11/2007	20º34´43" 18º32´26"	20º31´49" 18º33´25"	1812–1824	Fango Arenoso	*Acanthephyra pelagica, Glyphocrangon longirostris, Munidopsis curvirostra, Neolithodes asperrimus, Notostomus crosnieri, Systellaspis debilis*
Maurit-1107	5	MU05	18/11/2007	20º37´23" 18º25´28"	20º34´27" 18º26´28"	1400–1408	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea tarda, Sabinea hystrix, Stereomastis sculpta*
Maurit-1107	6	MU06	18/11/2007	20º36´13" 18º13´29"	20º38´40" 18º11´38"	1116–1144	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Heterocarpus grimaldii, Hymenopenaeus chacei, Nephropsis atlantica, Oplophorus spinosus, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	7	MU07	19/11/2007	20º45´06" 18º17´33"	20º44´48" 18º19´14"	1667–1658	Arena Fangosa	*Acanthephyra pelagica, Neolithodes asperrimus, Notostomus crosnieri, Pasiphaea multidentata, Pasiphaea semispinosa, Stereomastis nana, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	8	MU08	19/11/2007	20º40´19" 18º15´52"	20º41´10" 18º12´59"	1308–1308	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Heterocarpus grimaldii, Neolithodes asperrimus, Notostomus crosnieri, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea semispinosa, Sergia grandis*
Maurit-1107	9	MU09	19/11/2007	20º44´44" 18º07´59"	20º46´05" 18º05´08"	1412–1412	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Heterocarpus grimaldii, Neolithodes asperrimus, Parapagurus pilosimanus, Sabinea hystrix, Sergia* sp, *Stereomastis sculpta, Systellaspis debilis*
Maurit-1107	10	MU10	20/11/2007	20º18´05" 18º11´18"	20º18´26" 18º14´28"	1768–1777	Fango Arenoso	*Acanthephyra pelagica, Glyphocrangon longirostris, Glyphus marsupialis, Sergia grandis, Stereomastis nana, Systellaspis debilis*
Maurit-1107	11	MU11	20/11/2007	20º24´46" 18º07´42"	20º23´43" 18º04´53"	1305–1300	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Neolithodes asperrimus, Pasiphaea multidentata, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	12	MU12	20/11/2007	20º19´37" 18º07´24"	20º19´05" 18º04´13"	1590–1569	Fango Arenoso	*Acanthephyra pelagica, Glyphus marsupialis, Pasiphaea semispinosa, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	13	MU13	21/11/2007	20º25´35" 17º57´38"	20º27´32" 18º00´00"	1006–997	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Neolithodes asperrimus, Nephropsis atlantica, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea semispinosa, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	14	MU14	21/11/2007	20º39´01" 17º50´15"	20º36´18" 17º51´50"	502–511	Arena	*Bathynectes piperitus, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Paromola cuvieri, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika martia, Sergia robusta, Systellaspis debilis*
Maurit-1107	15	MU15	21/11/2007	20º27´14" 17º51´47"	20º24´31" 17º50´04"	670–675	Arena Fangosa	*Acanthephyra pelagica, Aegaeon lacazei, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Parapagurus pilosimanus, Pasiphaea multidentata, Polycheles typhlops, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	17	MU17	22/11/2007	20º10´22" 17º42´24"	20º11´25" 17º45´26"	818–861	Arena	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus antennatus, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Pasiphaea multidentata, Pasiphaea semispinosa, Plesionika heterocarpus, Psathyrocaris fragilis, Sergia robusta, Solenocera africana, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	18	MU18	22/11/2007	20º14´01" 17º39´16"	20º16´37" 17º37´16"	519–402	Arena	*Acanthephyra pelagica, Bathynectes piperitus, Chaceon maritae, Heterocarpus ensifer, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Parapenaeus longirostris, Paromola cuvieri, Pasiphaea semispinosa, Plesionika acanthonotus, Solenocera africana, Systellaspis debilis*
Maurit-1107	19	MU19	22/11/2007	20º05´04" 17º46´18"	20º02´05" 17º46´09"	1222–1218	Arena	*Acanthephyra pelagica*, Caridea indet, *Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Parapagurus pilosimanus, Pasiphaea tarda*
Maurit-1107	20	MU20	23/11/2007	19º54´16" 17º52´03"	19º56´49" 17º53´47"	1518–1538	Arena	*Acanthephyra pelagica, Notostomus crosnieri, Pasiphaea multidentata, Pasiphaea tarda*
Maurit-1107	21	MU21	23/11/2007	19º51´02" 17º44´20"	19º53´13" 17º46´28"	1453–1423	Fango Arenoso	*Acanthephyra pelagica, Hymenopenaeus chacei, Notostomus crosnieri, Parapagurus pilosimanus, Pasiphaea multidentata, Sergia grandis, Stereomastis sculpta, Systellaspis debilis*
Maurit-1107	22	MU22	23/11/2007	19º34´14" 17º31´44"	19º31´34" 17º30´21"	1689–1628	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphocrangon longirostris, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea tarda, Sabinea hystrix, Stereomastis nana*
Maurit-1107	23	MU23	24/11/2007	19º50´44" 17º25´25"	19º50´46" 17º23´48"	532–415	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Munida speciosa, Palinurus mauritanicus, Parapagurus pilosimanus, Parapenaeus longirostris, Paromola cuvieri, Plesionika acanthonotus, Psathyrocaris fragilis, Sergia* sp, *Solenocera africana*
Maurit-1107	24	MU24	24/11/2007	19º47´14" 17º23´48"	19º48´26" 17º26´36"	900–926	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Nephropsis atlantica, Psathyrocaris fragilis, Stereomastis talismani*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	25	MU25	24/11/2007	19º42´44" 17º28´58"	19º44´56" 17º30´53"	1432–1532	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	26	MU26	25/11/2007	19º39´08" 17º12´32"	19º41´31" 17º14´38"	744–744	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Metacrangon bellmarleyi, Nematocarcinus africanus, Paralomis cristulata, Sergia robusta, Stereomastis talismani*
Maurit-1107	27	MU27	25/11/2007	19º38´58" 17º16´39"	19º38´58" 17º17´39"	986–1016	Fango Arenoso	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Sergia robusta, Sergia* sp, *Stereomastis talismani, Systellaspis debilis*
Maurit-1107	28	MU28	25/11/2007	19º25´54" 17º19´57"	19º23´04" 17º20´04"	1537–1531	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphocrangon longirostris, Glyphus marsupialis, Hymenopenaeus chacei, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis sculpta, Systellaspis debilis*
Maurit-1107	29	MU29	25/11/2007	19º23´02" 17º12´35"	19º20´47" 17º10´26"	1195–1199	Arena	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Funchalia danae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Paralomis erinacea, Parapagurus pilosimanus, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	30	MU30	26/11/2007	19º18´26" 17º16´07"	19º20´34" 17º18´15"	1448–1459	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea tarda, Sabinea hystrix, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	31	MU31	26/11/2007	19º25´29" 17º33´17"	19º22´44" 17º32´11"	1778–1811	Fango Arenoso	*Acanthephyra pelagica, Glyphocrangon longirostris, Nematocarcinus ensifer, Neolithodes asperrimus, Sabinea hystrix, Stereomastis nana*
Maurit-1107	32	MU32	26/11/2007	19º14´51" 17º21´58"	19º12´31" 17º19´52"	1681–1682	Fango Arenoso	*Acanthephyra pelagica, Glyphocrangon longirostris, Lithodes ferox, Stereomastis nana, Stereomastis sculpta, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	33	MU33	27/11/2007	19º15´21" 16º59´38"	19º13´57" 16º57´33"	741–736	Arena	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Parapagurus pilosimanus, Pasiphaea multidentata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	34	MU34	27/11/2007	19º11´03" 17º00´17"	19º10´16" 16º59´01"	938–935	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nematocarcinus africanus, Nephropsis atlantica, Parapagurus pilosimanus, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani*
Maurit-1107	35	MU35	27/11/2007	19º08´31" 17º09´01"	19º06´14" 17º07´05"	1522–1530	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Ephyrina* sp, *Glyphus marsupialis, Hymenopenaeus chacei, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis nana, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	36	MU36	27/11/2007	19º02´54" 17º03´10"	18º59´58" 17º03´45"	1385–1394	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea tarda, Sabinea hystrix, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	37	MU37	29/11/2007	19º02´16" 16º50´40"	18º59´15" 16º50´52"	403–442	Arena	*Acanthephyra pelagica, Aegaeon lacazei, Aristeus varidens, Bathynectes piperitus, Heterocarpus ensifer, Hymenopenaeus chacei, Munida speciosa, Parapagurus pilosimanus, Parapenaeus longirostris, Paromola cuvieri, Plesionika acanthonotus, Plesionika carinata, Plesionika heterocarpus, Plesionika martia, Sergia* sp, *Solenocera africana, Systellaspis debilis*
Maurit-1107	38	MU38	29/11/2007	18º58´40" 16º56´38"	18º55´35" 16º56´47"	920–918	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Notostomus crosnieri, Pasiphaea semispinosa, Sergia robusta, Stereomastis talismani*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	39	MU39	29/11/2007	18º51´13" 17º01´57"	18º54´14" 17º01´47"	1215–1240	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Paralomis erinacea, Pasiphaea tarda, Plesionika carinata, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	40	MU40	29/11/2007	18º55´03" 17º09´01"	18º58´01" 17º08´25"	1683–1675	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis sculpta, Systellaspis debilis*
Maurit-1107	41	MU41	30/11/2007	18º48´47" 17º07´18"	18º45´50" 17º06´41"	1556–1581	Fango Arenoso	*Acanthephyra pelagica, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea tarda, Sergia robusta, Stereomastis nana, Stereomastis talismani*
Maurit-1107	42	MU42	30/11/2007	18º32´47" 16º53´38"	18º29´52" 16º52´56"	1180–1178	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Metacrangon bellmarleyi, Munidopsis chunii, Notostomus crosnieri, Paralomis erinacea, Sergia robusta, Stereomastis talismani, Systellaspis cristata, Systellaspis debilis*
Maurit-1107	43	MU43	30/11/2007	18º24´30" 16º55´02"	18º21´36" 16º54´04"	1406–1409	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	44	MU44	01/12/2007	18º30´41" 16º43´46"	18º33´41" 16º44´31"	606–596	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Glyphus marsupialis, Goneplax barnardi, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta*
Maurit-1107	45	MU45	01/12/2007	18º44´11" 16º46´53"	18º46´41" 16º48´40"	420–427	Arena	*Bathynectes piperitus, Munida speciosa, Nematocarcinus africanus,* Paguroidea indet, *Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika heterocarpus, Plesionika martia, Solenocera africana*
Maurit-1107	46	MU46	01/12/2007	18º33´12" 16º48´22"	18º30´14" 16º47´40"	848–847	Arena Fangosa	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Pasiphaea semispinosa, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	47	MU47	01/12/2007	18º27´30" 16º49´29"	18º24´34" 16º48´46"	1000–1006	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nephropsis atlantica, Pasiphaea multidentata, Psathyrocaris fragilis, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	48	MU48	02/12/2007	18º01´53" 16º48´35"	18º04´51" 16º47´49"	1239–1218	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Notostomus crosnieri, Paralomis erinacea, Pasiphaea tarda, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	49	MU49	02/12/2007	18º08´33" 16º53´01"	18º11´19" 16º52´47"	1546–1577	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Parapagurus pilosimanus, Pasiphaea tarda, Sergia* sp, *Stereomastis nana, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	50	MU50	02/12/2007	17º52´46" 16º48´54"	17º49´53" 16º49´38"	1054–1075	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nephropsis atlantica, Notostomus crosnieri, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	51	MU51	03/12/2007	17º47´32" 16º39´47"	17º49´51" 16º39´13"	464–468	Arena	*Acanthocarpus brevispinis, Aristeus varidens, Bathynectes piperitus, Munida speciosa, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika carinata, Plesionika martia, Polycheles typhlops, Solenocera africana*
Maurit-1107	52	MU52	03/12/2007	17º48´50" 16º45´25"	17º45´54" 16º46´14"	774–792	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Nephropsis atlantica, Notostomus crosnieri, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani*
Maurit-1107	53	MU53	03/12/2007	17º44´57" 16º48´43"	17º48´04" 16º48´27"	952–957	Fango Arenoso	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nephropsis atlantica, Parapagurus pilosimanus, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	54	MU54	03/12/2007	17º39´49" 16º39´02"	17º36´58" 16º39´10"	414–451	Arena	*Aegaeon lacazei, Aristeus varidens, Bathynectes piperitus, Glyphus marsupialis, Goneplax barnardi, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika martia, Sergia* sp, *Solenocera africana*

Campaña	**Lance**	**Código**	**Fecha**	**Latitud (N) Longitud (O) inicio**	**Latitud (N) Longitud (O) fin**	**Profundidad (m) Inicio-fin**	**Naturaleza del fondo**	**Especies**
Maurit-1107	55	MU55	04/12/2007	17º26´37" 16º54´13"	17º25´58" 16º52´49"	1310–1218	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Paralomis erinacea, Parapagurus pilosimanus, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1107	56	MU56	04/12/2007	17º19´07" 16º55´48"	17º21´53" 16º54´26"	1091–1159	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Neolithodes asperrimus, Nephropsis atlantica, Paralomis erinacea, Pasiphaea tarda, Stereomastis talismani*
Maurit-1107	57	MU57	04/12/2007	17º11´05" 16º47´52"	17º13´32" 16º47´20"	430–406	Arena	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Goneplax barnardi, Munida speciosa, Nematocarcinus africanus, Pagurus alatus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika heterocarpus, Plesionika martia, Sergia* sp*, Solenocera africana*
Maurit-1107	58	MU58	05/12/2007	16º45´41" 17º07´48"	16º48´06" 17º06´15"	1598–1566	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Notostomus crosnieri, Oplophorus spinosus, Pasiphaea tarda, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	59	MU59	05/12/2007	16º47´37" 16º59´49"	16º50´38" 16º58´34"	1215–1282	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Notostomus crosnieri, Sergia robusta, Stereomastis talismani*
Maurit-1107	60	MU60	05/12/2007	16º32´34" 17º06´28"	16º29´45" 17º07´31"	1512–1530	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Hymenopenaeus chacei, Munidopsis chunii, Neolithodes asperrimus, Notostomus crosnieri, Parapagurus pilosimanus, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	61	MU61	06/12/2007	16º07´46" 17º08´22"	16º10´10" 17º06´36"	1440–1434	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea tarda, Sabinea hystrix, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	62	MU62	06/12/2007	16º09´35" 17º04´18"	16º12´06" 17º02´32"	1236–1244	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Paralomis erinacea, Pasiphaea tarda, Stereomastis talismani*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	63	MU63	06/12/2007	16º18´39" 16º55´12"	16º21´32" 16º54´59"	848–798	Arena	*Acanthephyra pelagica*, *Aristeus varidens*, *Bathynectes piperitus*, *Glyphus marsupialis*, *Hymenopenaeus chacei*, *Lithodes ferox*, *Nematocarcinus africanus*, *Nephropsis atlantica*, *Parapagurus pilosimanus*, *Plesionika carinata*, *Psathyrocaris fragilis*, *Sergia* sp, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1107	64	MU64	06/12/2007	16º23´28" 16º51´44"	16º26´24" 16º51´01"	452–468	Arena	*Aristeus varidens*, *Bathynectes piperitus*, *Hymenopenaeus chacei*, *Munida guineae*, *Nematocarcinus africanus*, *Parapenaeus longirostris*, *Pasiphaea semispinosa*, *Plesionika acanthonotus*, *Plesionika carinata*, *Plesionika martia*, *Psathyrocaris fragilis*, *Sergia* sp, *Solenocera africana*, *Stereomastis talismani*
Maurit-1107	65	MU65	07/12/2007	16º25´09" 16º56´55"	16º22´08" 16º57´15"	1007–1004	Arena	*Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Hymenopenaeus chacei*, *Metacrangon bellmarleyi*, *Munidopsis chunii*, *Nephropsis atlantica*, *Notostomus crosnieri*, *Sergia robusta*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1107	66	MU66	07/12/2007	16º23´09" 17º00´18"	16º26´16" 17º00´20"	1243–1317	Arena Fangosa	*Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Hymenopenaeus chacei*, *Munidopsis chunii*, *Nephropsis atlantica*, *Notostomus crosnieri*, *Sergia grandis*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1107	67	MU67	07/12/2007	16º31´10" 17º04´27"	16º34´09" 17º03´38"	1381–1390	Arena Fangosa	*Acanthephyra pelagica*, *Benthesicymus bartletti*, *Chaceon maritae*, *Glyphus marsupialis*, *Hymenopenaeus chacei*, *Neolithodes asperrimus*, *Parapagurus pilosimanus*, *Pasiphaea tarda*, *Stereomastis sculpta*, *Stereomastis talismani*
Maurit-1107	68	MU68	07/12/2007	16º38´19" 16º59´29"	16º41´10" 17º00´05"	1136–1146	Arena Fangosa	*Acanthephyra pelagica*, *Aristeus varidens*, *Chaceon maritae*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Hymenopenaeus chacei*, *Metacrangon bellmarleyi*, *Munidopsis chunii*, *Parapagurus pilosimanus*, *Psathyrocaris fragilis*, *Sergia* sp, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1107	69	MU69	08/12/2007	16º50´32" 17º06´52"	16º52´52" 17º04´49"	1629–1648	Arena Fangosa	*Acanthephyra pelagica*, *Benthesicymus bartletti*, *Hymenopenaeus chacei*, *Munidopsis chunii*, *Neolithodes asperrimus*, *Pasiphaea tarda*, *Sabinea hystrix*, *Sergia robusta*, *Stereomastis nana*, *Stereomastis sculpta*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	70	MU70	08/12/2007	16º55´14" 16º48´39"	16º58´20" 16º48´53"	755–801	Arena	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Plesionika acanthonotus, Plesionika carinata, Psathyrocaris fragilis, Sergia* sp, *Stereomastis talismani*
Maurit-1107	71	MU71	08/12/2007	17º07´09" 16º52´54"	17º10´16" 16º53´27"	812–837	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nematocarcinus africanus, Nephropsis atlantica, Notostomus crosnieri, Paralomis cristulata, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Stereomastis talismani*
Maurit-1107	73	MU73	09/12/2007	17º15´50" 16º58´10"	17º18´42" 16º58´55"	1330–1284	Fango	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Notostomus crosnieri, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	74	MU74	09/12/2007	17º26´59" 17º03´46"	17º29´27" 17º01´52"	1735–1750	Fango	*Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea tarda, Stereomastis nana, Systellaspis debilis*
Maurit-1107	75	MU75	10/12/2007	17º36´56" 17º00´28"	17º39´58" 17º00´30"	1688–1659	Fango	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Notostomus crosnieri, Parapagurus nudus, Pasiphaea tarda, Stereomastis nana*
Maurit-1107	76	MU76	10/12/2007	17º35´19" 16º55´56"	17º34´37" 16º52´49"	1556–1398	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea tarda, Sabinea hystrix, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani*
Maurit-1107	77	MU77	10/12/2007	17º31´09" 16º53´28"	17º33´49" 16º52´34"	1277–1340	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Stereomastis talismani*
Maurit-1107	78	MU78	11/12/2007	18º07´10" 16º40´28"	18º04´11" 16º41´19"	842–850	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Pasiphaea multidentata, Plesionika carinata, Stereomastis talismani*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1107	79	MU79	11/12/2007	18º04´20" 16º36´39"	18º07´20" 16º36´07"	554–576	Fango Arenoso	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika martia, Psathyrocaris fragilis, Sergia robusta*
Maurit-0811	1	MU80	17/11/2008	18º20´50" 16º58´29"	18º23´34" 16º59´32"	1666–1680	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Neolithodes asperrimus, Notostomus crosnieri, Pasiphaea tarda, Stereomastis nana, Stereomastis sculpta, Systellaspis debilis*
Maurit-0811	2	MU81	17/11/2008	18º40´29" 16º52´43"	18º42´54" 16º54´34"	912–900	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens,* Caridea indet, *Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	3	MU82	17/11/2008	18º40´20" 16º59´20"	18º41´29" 17º00´22"	1298–1435	Fango Arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Pasiphaea tarda, Stereomastis talismani*
Maurit-0811	4	MU83	18/11/2008	20º26´05" 18º19´40"	20º27´22" 18º22´20"	1435–1420	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti,* Caridea indet, *Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Notostomus crosnieri, Pasiphaea tarda, Sabinea hystrix, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	5	MU84	18/11/2008	20º42´20" 18º27´53"	20º44´37" 18º25´56"	1680–1718	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphocrangon longirostris, Munidopsis curvirostra, Neolithodes asperrimus, Neolithodes grimaldii, Sabinea hystrix, Stereomastis nana, Systellaspis debilis*
Maurit-0811	6	MU85	18/11/2008	20º35´48" 18º04´53"	20º37´56" 18º02´37"	898–862	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Nematocarcinus africanus, Nephropsis atlantica, Parapagurus pilosimanus, Sabinea hystrix, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	7	MU86	19/11/2008	20º44´40" 17º37´37"	20º41´40" 17º38´19"	91–103	Arena	*Dardanus arrosor, Macropipus rugosus, Munida speciosa, Pagurus prideaux, Plesionika heterocarpus, Solenolambrus noordendei*
Maurit-0811	8	MU87	19/11/2008	20º37´29" 17º42´37"	20º35´19" 17º44´55"	271–305	Arena	*Dardanus arrosor, Ebalia nux, Homola barbata, Palinurus mauritanicus, Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0811	9	MU88	19/11/2008	20º29´25" 17º39´03"	20º26´46" 17º40´35"	94–120	Arena	*Homola barbata, Inachus angolensis, Munida speciosa, Pagurus cuanensis, Pagurus prideaux, Plesionika heterocarpus, Scyllarus subarctus*

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Maurit-0811	10	MU89	20/11/2008	20º20´50" 17º53´30"	20º18´23" 17º52´03"	1012–1000	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Lebbeus africanus, Munidopsis anaramosae, Neolithodes asperrimus, Pasiphaea multidentata, Sergia robusta, Systellaspis debilis*
Maurit-0811	11	MU90	20/11/2008	20º09´23" 17º36´47"	20º06´30" 17º36´48"	110–110	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris, Scyllarus subarctus*
Maurit-0811	12	MU91	20/11/2008	20º04´35" 17º48´29"	20º01´39" 17º48´08"	1418–1355	Arena	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea tarda, Sergia robusta, Stereomastis sculpta, Systellaspis debilis*
Maurit-0811	13	MU92	21/11/2008	19º55´41" 18º01´07"	19º53´05" 18º02´01"	1808–1862	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphocrangon longirostris, Munidopsis chunii, Munidopsis curvirostra, Neolithodes asperrimus, Neolithodes grimaldii, Sergia* sp, *Stereomastis nana, Systellaspis debilis*
Maurit-0811	14	MU93	21/11/2008	19º51´02" 17º55´33"	19º49´33" 17º53´00"	1740–1769	Arena	*Acanthephyra eximia, Acanthephyra pelagica, Glyphocrangon longirostris, Munidopsis curvirostra, Neolithodes asperrimus, Pasiphaea tarda, Sergia robusta, Stereomastis nana, Systellaspis debilis*
Maurit-0811	15	MU94	21/11/2008	19º35´15" 17º35´13"	19º32´43" 17º33´37"	1720–1734	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphocrangon longirostris, Munidopsis curvirostra, Pasiphaea tarda, Sergia grandis, Stereomastis nana, Systellaspis debilis*
Maurit-0811	16	MU95	22/11/2008	19º39´02" 17º24´34"	19º36´39" 17º22´42"	1393–1302	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis sculpta, Stereomastis talismani*
Maurit-0811	17	MU96	22/11/2008	19º26´26" 17º15´23"	19º23´33" 17º15´55"	1297–1300	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Metacrangon bellmarleyi, Munidopsis chunii, Neolithodes asperrimus, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Systellaspis debilis*

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Maurit-0811	18	MU97	22/11/2008	19º24´18" 17º08´01"	19º21´57" 17º06´04"	896–1064	Arena	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Nematocarcinus africanus, Nephropsis atlantica, Notostomus crosnieri, Pasiphaea multidentata, Pasiphaea semispinosa, Pasiphaea* sp*, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	20	MU99	23/11/2008	18º21´45" 16º41´12"	18º18´55" 16º40´20"	569–598	Arena Fangosa	*Acanthephyra pelagica, Acanthocarpus brevispinis, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Systellaspis debilis*
Maurit-0811	21	MU100	23/11/2008	18º08´43" 16º32´09"	18º05´23" 16º31´34"	236–238	Arena	*Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Plesionika carinata, Plesionika heterocarpus*
Maurit-0811	22	MU101	23/11/2008	17º58´45" 16º24´17"	17º55´53" 16º23´27"	104–96	Arena	*Macropipus rugosus, Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0811	24	MU103	24/11/2008	18º01´06" 16º52´42"	18º03´53" 16º52´34"	1422–1470	Fango Arenoso	*Acanthephyra acanthitelsonis, Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea tarda, Plesionika carinata, Sergia grandis, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	25	MU104	24/11/2008	17º56´07" 16º40´26"	17º58´49" 16º38´56"	652–627	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Parapontophilus gracilis gracilis, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Systellaspis debilis*
Maurit-0811	26	MU105	24/11/2008	17º58´21" 16º34´32"	17º55´27" 16º35´19"	343–346	Arena	*Hymenopenaeus chacei, Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika edwardsii, Plesionika heterocarpus, Plesionika* sp*, Solenocera africana, Systellaspis debilis*
Maurit-0811	27	MU106	25/11/2008	17º28´07" 16º46´25"	17º29´58" 16º48´58"	850–1010	Arena Fangosa	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nephropsis atlantica, Parapontophilus gracilis gracilis, Plesionika carinata, Psathyrocaris fragilis, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0811	28	MU107	25/11/2008	17º26´29" 16º43´48"	17º29´19" 16º43´05"	640–660	Arena Fangosa	*Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Parapagurus pilosimanus, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia* sp
Maurit-0811	29	MU108	25/11/2008	17º22´55" 16º37´41"	17º20´16" 16º39´13"	200–202	Arena	*Palinurus mauritanicus, Parapenaeus longirostris*
Maurit-0811	31	MU110	26/11/2008	17º03´04" 17º02´23"	17º00´32" 17º01´07"	1644–1635	Fango	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea tarda, Stereomastis talismani*
Maurit-0811	32	MU111	26/11/2008	17º09´13" 16º57´13"	17º06´17" 16º56´13"	1107–1096	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Nephropsis atlantica, Paralomis erinacea, Psathyrocaris fragilis, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	33	MU112	26/11/2008	16º58´15" 16º53´52"	16º53´20" 16º54´58"	1331–1347	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Paralomis erinacea, Pasiphaea tarda, Plesionika carinata, Stereomastis talismani*
Maurit-0811	34	MU113	27/11/2008	16º19´16" 17º01´07"	16º21´14" 17º03´26"	1322–1475	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea tarda, Stereomastis talismani, Systellaspis cristata, Systellaspis debilis*
Maurit-0811	35	MU114	27/11/2008	16º19´31" 17º05´50"	16º16´34" 17º06´53"	1590–1677	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea tarda, Plesionika carinata, Stereomastis sculpta, Stereomastis talismani*
Maurit-0811	36	MU115	27/11/2008	16º08´60" 16º58´43"	16º06´36" 17º00´33"	651–693	Arena Fangosa	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus antennatus, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Plesionika carinata, Plesionika martia, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0811	37	MU116	28/11/2008	16º41´57" 17º08´52"	16º44´51" 17º10´14"	1685–1680	Arena Fangosa	*Acanthephyra acanthitelsonis*, *Acanthephyra pelagica*, *Glyphocrangon longirostris*, *Hymenopenaeus chacei*, *Neolithodes asperrimus*, *Notostomus crosnieri*, *Parapagurus nudus*, *Pasiphaea tarda*, Penaeidae indet, *Sergia* sp, *Stereomastis nana*, *Systellaspis pellucida*
Maurit-0811	38	MU117	28/11/2008	16º31´47" 17º00´14"	16º29´09" 16º58´47"	1124–1010	Arena Fangosa	*Acanthephyra pelagica*, *Aristeus varidens*, *Benthesicymus bartletti*, *Ephyrina figueirai figueirai*, *Glyphus marsupialis*, *Hymenopenaeus chacei*, *Metacrangon bellmarleyi*, *Munidopsis chunii*, *Neolithodes asperrimus*, *Plesionika carinata*, *Sergia* sp, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-0811	39	MU118	29/11/2008	17º29´17" 16º37´14"	17º32´06" 16º36´04"	231–224	Arena	*Munida speciosa*, *Parapenaeus longirostris*, *Plesionika heterocarpus*
Maurit-0811	40	MU119	29/11/2008	17º31´58" 16º23´00"	17º34´58" 16º21´47"	82–80	Arena	*Homola barbata*, *Macropodia gilsoni*, *Macropodia hesperiae*
Maurit-0811	41	MU120	30/11/2008	16º05´49" 16º51´20"	16º08´23" 16º49´32"	109–105	Arena	*Dardanus arrosor*, *Homola barbata*, *Inachus aguiarii*, *Macropipus rugosus*, *Macropodia gilsoni*, *Monodaeus cristulatus*, *Munida speciosa*, *Pagurus alatus*, *Pagurus cuanensis*, *Pisa armata*
Maurit-0811	42	MU121	30/11/2008	16º10´05" 16º53´01"	16º08´48" 16º54´43"	274–400	Arena	*Acanthocarpus brevispinis*, *Nematocarcinus africanus*, *Parapenaeus longirostris*, *Paromola cuvieri*, *Plesionika edwardsii*, *Plesionika heterocarpus*, *Plesionika martia*, *Solenocera africana*
Maurit-0811	43	MU122	30/11/2008	16º17´53" 16º47´08"	16º20´35" 16º45´47"	107–97	Arena	*Homola barbata*, *Munida speciosa*
Maurit-0811	44	MU123	30/11/2008	16º23´07" 16º50´01"	16º26´08" 16º50´26"	278–362	Arena	*Bathynectes piperitus*, *Goneplax barnardi*, *Heterocarpus ensifer*, *Munida speciosa*, *Nematocarcinus africanus*, *Parapenaeus longirostris*, *Pasiphaea semispinosa*, *Plesionika acanthonotus*, *Plesionika carinata*, *Plesionika edwardsii*, *Plesionika heterocarpus*, *Solenocera africana*
Maurit-0811	45	MU124	30/11/2008	16º27´21" 16º45´28"	16º29´43" 16º43´35"	97–85	Arena	*Dardanus arrosor*, *Parapenaeus longirostris*
Maurit-0811	46	MU125	01/12/2008	16º35´49" 16º45´35"	16º38´39" 16º44´29"	103–101	*Arena*	*Macropipus rugosus*, *Munida speciosa*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0811	47	MU126	01/12/2008	16º36´35" 16º54´20"	16º39´42" 16º54´26"	668–826	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani*
Maurit-0811	48	MU127	01/12/2008	16º37´29" 16º48´23"	16º34´28" 16º48´28"	260–353	Arena	*Bathynectes piperitus, Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika brevipes, Plesionika edwardsii, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	49	MU128	01/12/2008	16º33´15" 16º48´07"	16º31´09" 16º48´27"	218–404	Arena	*Homola barbata, Munida speciosa, Nematocarcinus africanus, Palinurus mauritanicus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika brevipes, Plesionika heterocarpus, Pseudomyra mbizi, Solenocera africana*
Maurit-0811	50	MU129	02/12/2008	16º52´43" 16º45´08"	16º53´53" 16º44´25"	95–93	Arena	*Aegaeon cataphractus, Inachus aguiarii, Macropodia hesperiae, Munida speciosa*
Maurit-0811	51	MU130	02/12/2008	16º44´31" 16º46´48"	16º47´12" 16º47´01"	252–362	Arena	*Inachus angolensis, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika edwardsii, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	52	MU131	02/12/2008	17º00´55" 16º43´21"	17º03´33" 16º41´50"	102–104	Arena	*Homola barbata, Inachus aguiarii, Macropodia gilsoni, Munida speciosa, Pagurus cuanensis, Pisa armata, Spinolambrus notialis*
Maurit-0811	53	MU132	02/12/2008	17º01´25" 16º34´26"	17º04´04" 16º33´01"	83–82	Arena	*Munida speciosa*
Maurit-0811	54	MU133	02/12/2008	17º08´44" 16º31´19"	17º11´31" 16º29´49"	87–87	Arena	*Inachus angolensis*, Paguroidea indet, *Pagurus cuanensis*
Maurit-0811	55	MU134	03/12/2008	17º06´06" 16º46´45"	17º03´10" 16º47´13"	311–436	Arena	*Acanthocarpus brevispinis, Bathynectes piperitus, Munida speciosa, Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika edwardsii, Plesionika heterocarpus, Sergia* sp, *Solenocera africana*
Maurit-0811	56	MU135	03/12/2008	17º15´20" 16º41´04"	17º17´38" 16º39´07"	185–173	Arena	*Macropipus rugosus, Munida speciosa, Nematocarcinus africanus, Parapenaeus longirostris, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	57	MU136	03/12/2008	17º16´40" 16º33´04"	17º19´34" 16º32´06"	103–112	Arena	*Dardanus arrosor, Pisa armata*
Maurit-0811	58	MU137	03/12/2008	17º21´43" 16º25´29"	17º24´47" 16º25´00"	81–84	Arena	*Dardanus arrosor, Inachus angolensis, Macropipus rugosus*

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Maurit-0811	59	MU138	04/12/2008	17º27´42" 16º30´29"	17º30´44" 16º30´12"	123–130	Arena	*Macropipus rugosus, Macropodia gilsoni, Munida speciosa, Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0811	60	MU139	04/12/2008	17º39´19" 16º23´23"	17º42´25" 16º23´20"	96–97	Arena	*Dardanus arrosor, Macropodia gilsoni, Parapenaeus longirostris, Pisa armata*
Maurit-0811	61	MU140	04/12/2008	17º39´25" 16º38´11"	17º42´28" 16º38´00"	376–377	Arena	*Munida speciosa, Nematocarcinus africanus, Paguristes candelae, Palinurus mauritanicus, Parapenaeus longirostris, Paromola cuvieri, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika carinata, Plesionika heterocarpus, Plesionika martia, Sergia* sp, *Solenocera africana*
Maurit-0811	62	MU141	04/12/2008	17º46´56" 16º34´53"	17º49´52" 16º34´16"	280–277	Arena	*Macropodia macrocheles, Palinurus mauritanicus, Parapenaeus longirostris, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	63	MU142	05/12/2008	18º09´13" 16º28´17"	18º12´29" 16º28´34"	109–112	Arena	*Aegaeon cataphractus, Munida speciosa, Pagurus alatus*
Maurit-0811	64	MU143	05/12/2008	18º15´41" 16º35´16"	18º18´29" 16º36´34"	322	Arena	*Acanthocarpus brevispinis, Bathynectes piperitus, Goneplax rhomboides, Munida speciosa, Nematocarcinus africanus, Palinurus mauritanicus, Paragiopagurus macrocerus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika heterocarpus, Plesionika martia, Solenocera africana*
Maurit-0811	65	MU144	05/12/2008	18º17´21" 16º29´14"	18º20´19" 16º29´12"	119–138	Arena	*Macropipus rugosus, Munida speciosa, Pagurus alatus, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Plesionika narval, Scyllarus subarctus*
Maurit-0811	66	MU145	05/12/2008	18º26´47" 16º36´14"	18º29´45" 16º36´42"	232–230	Arena	*Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	67	MU146	06/12/2008	18º29´02" 16º39´35"	18º32´00" 16º39´35"	356–360	Arena	*Palinurus mauritanicus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika heterocarpus, Plesionika martia, Solenocera africana*
Maurit-0811	68	MU147	06/12/2008	18º41´01" 16º34´31"	18º38´04" 16º33´14"	134–139	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris, Pisa armata, Plesionika heterocarpus*
Maurit-0811	69	MU148	06/12/2008	18º42´02" 16º36´28"	18º39´56" 16º38´29"	215–245	Arena	*Dardanus arrosor, Macropipus rugosus, Parapenaeus longirostris, Plesionika brevipes, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	70	MU149	06/12/2008	18º47´59" 16º30´21"	18º51´05" 16º30´26"	93–146	Arena	*Dardanus arrosor, Farfantepenaeus notialis, Macropipus rugosus, Macropodia gilsoni, Macropodia macrocheles, Pagurus cuanensis, Parapenaeus longirostris, Plesionika narval, Scyllarus subarctus*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0811	71	MU150	07/12/2008	18º44´54" 16º44´10"	18º42´20" 16º42´42"	292–341	Arena	*Munida speciosa, Palinurus mauritanicus, Parapenaeus longirostris, Paromola cuvieri, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika ensis, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	72	MU151	07/12/2008	18º49´50" 16º38´03"	18º52´17" 16º39´59"	110–134	Arena	*Macropodia gilsoni, Munida speciosa, Parapenaeus longirostris*
Maurit-0811	73	MU152	07/12/2008	18º50´25" 16º48´58"	18º53´35" 16º49´03"	381–316	Arena	*Goneplax barnardi, Munida speciosa, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	74	MU153	07/12/2008	18º56´13" 16º46´09"	18º58´56" 16º47´24"	216–218	Arena	*Dardanus arrosor, Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus*
Maurit-0811	75	MU154	08/12/2008	18º57´13" 16º38´48"	19º00´10" 16º39´13"	92–102	Arena	*Macropipus rugosus, Macropodia hesperiae, Munida speciosa, Pisa armata, Plesionika heterocarpus, Scyllarus subarctus*
Maurit-0811	76	MU155	08/12/2008	19º04´38" 16º46´17"	19º03´18" 16º48´58"	210–257	Arena	*Macropipus rugosus, Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Plesionika ensis, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	77	MU156	08/12/2008	19º08´17" 16º39´56"	19º11´17" 16º39´40"	107–102	Arena	*Dardanus arrosor, Macropodia gilsoni, Pagurus cuanensis, Plesionika heterocarpus*
Maurit-0811	78	MU157	08/12/2008	19º12´04" 16º50´13"	19º14´27" 16º49´40"	278–454	Arena	*Macropodia macrocheles, Munida speciosa, Palinurus mauritanicus, Parapenaeus longirostris, Paromola cuvieri, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	79	MU158	08/12/2008	19º15´38" 16º43´32"	19º12´56" 16º42´10"	80–98	Arena	*Aegaeon cataphractus, Calappa pelii, Dardanus arrosor, Homola barbata, Macropodia* sp, *Munida speciosa, Pagurus alatus*
Maurit-0811	80	MU159	09/12/2008	17º37´55" 16º34´30"	17º41´01" 16º34´24"	224–229	Arena	*Macropodia macrocheles, Parapenaeus longirostris, Plesionika heterocarpus, Solenocera africana*
Maurit-0811	81	MU160	09/12/2008	17º38´31" 16º29´14"	17º41´17" 16º29´07"	143–147	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris*
Maurit-0811	82	MU161	09/12/2008	17º47´48" 16º20´46"	17º50´57" 16º21´16"	89–92	Arena	*Dardanus arrosor, Inachus angolensis, Macropipus rugosus, Macropodia gilsoni, Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0811	83	MU162	09/12/2008	17º52´50" 16º28´28"	17º55´53" 16º28´31"	148–149	Arena	*Homola barbata, Macropipus rugosus, Munida speciosa, Parapenaeus longirostris*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0811	84	MU163	10/12/2008	18º27´26" 16º59´04"	18º30´14" 16º58´15"	1518–1516	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Hymenopenaeus chacei, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Sergia* sp*, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	85	MU164	10/12/2008	18º16´55" 16º44´46"	18º14´24" 16º43´19"	998–1004	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nephropsis atlantica, Pasiphaea multidentata, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	86	MU165	10/12/2008	18º09´12" 16º47´09"	18º06´10" 16º47´20"	1214–1216	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Paralomis erinacea, Pasiphaea tarda, Sergia* sp*, Stereomastis talismani*
Maurit-0811	87	MU166	11/12/2008	18º09´24" 16º25´38"	18º12´19" 16º25´32"	87–85	Arena	*Aegaeon cataphractus, Inachus nanus, Macropipus rugosus, Macropodia gilsoni, Munida speciosa, Pagurus cuanensis, Sicyonia galeata*
Maurit-0811	88	MU167	11/12/2008	18º28´10" 16º30´11"	18º31´12" 16º30´27"	101–108	Arena	*Macropipus rugosus, Munida speciosa, Plesionika heterocarpus, Scyllarus subarctus*
Maurit-0811	89	MU168	12/12/2008	19º25´20" 16º52´13"	19º23´20" 16º53´28"	87–92	Arena	*Aegaeon cataphractus, Dardanus arrosor, Inachus angolensis, Macropipus rugosus, Macropodia gilsoni, Plesionika narval*
Maurit-0811	90	MU169	12/12/2008	19º25´18" 17º06´23"	19º28´07" 17º07´12"	776–724	Arena	*Acanthephyra pelagica, Aristaeopsis edwardsiana, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nematocarcinus africanus, Nephropsis atlantica, Pasiphaea multidentata, Pasiphaea semispinosa, Psathyrocaris fragilis, Stereomastis talismani, Systellaspis debilis*
Maurit-0811	91	MU170	12/12/2008	19º30´49" 16º57´20"	19º33´55" 16º57´47"	102–92	Arena	*Macropodia gilsoni, Solenolambrus noordendei*
Maurit-0811	92	MU171	12/12/2008	19º35´19" 16º59´05"	19º38´25" 16º58´55"	105–100	Arena	*Anapagurus laevis, Dardanus arrosor, Diogenes pugilator, Monodaeus cristulatus, Munida speciosa, Pagurus cuanensis, Plesionika heterocarpus, Solenolambrus noordendei*
Maurit-0811	93	MU172	13/12/2008	19º38´55" 17º06´17"	19º38´41" 17º05´09"	240–282	Arena	*Munida speciosa, Palinurus mauritanicus, Parapenaeus longirostris, Plesionika martia*
Maurit-0811	94	MU173	13/12/2008	19º44´50" 17º11´02"	19º45´24" 17º12´22"	314–540	Fango Arenoso	*Dardanus arrosor, Heterocarpus ensifer, Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Plesionika acanthonotus, Plesionika heterocarpus*

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Maurit-0811	95	MU174	13/12/2008	19º50´01" 17º13´22"	19º52´17" 17º15´46"	85–84	Fango Arenoso	*Dardanus arrosor, Inachus angolensis, Pagurus cuanensis*
Maurit-0811	96	MU175	13/12/2008	19º47´30" 17º18´26"	19º48´07" 17º20´32"	618–850	Fango Arenoso	*Acanthephyra pelagica, Aristaeomorpha foliacea, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Eumunida bella, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Paromola cuvieri, Psathyrocaris fragilis, Sergia* sp
Maurit-0811	97	MU176	13/12/2008	18º37´48" 17º02´30"	18º40´15" 17º04´40"	1590–1655	Fango Arenoso	*Acanthephyra pelagica, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea tarda, Stereomastis sculpta*
Maurit-0811	98	MU177	14/12/2008	18º48´41" 16º52´00"	18º51´44" 16º51´59"	584–580	Arena	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Sergia* sp, *Stereomastis talismani*
Maurit-0811	99	MU178	14/12/2008	18º59´55" 16º57´13"	19º02´55" 16º57´29"	968–969	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Nephropsis atlantica, Systellaspis debilis*
Maurit-0911	1	MU179	16/11/2009	18º48´25" 16º45´59"	18º46´46" 16º45´23"	303–304	Arena	*Bathynectes piperitus*, Decapoda indet, *Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus, Solenocera africana*
Maurit-0911	2	MU180	16/11/2009	18º47´49" 16º57´11"	18º50´56" 16º57´22"	906–919	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea multidentata, Plesionika carinata, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	3	MU181	17/11/2009	19º11´00" 16º44´53"	19º12´27" 16º45´50"	142–148	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0911	4	MU182	17/11/2009	19º11´39" 16º57´03"	19º12´40" 16º59´52"	726–726	Arena	*Acanthephyra pelagica, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Nephropsis atlantica, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	5	MU183	18/11/2009	19º40´41" 17º04´53"	19º39´27" 17º03´38"	138–177	Fango Arenoso	*Dardanus arrosor, Eurynome aspera, Munida speciosa, Parapenaeus longirostris, Plesionika heterocarpus, Solenolambrus noordendei*
Maurit-0911	6	MU184	18/11/2009	19º29´44" 17º01´19"	19º28´06" 17º00´43"	213–202	Arena	*Homola barbata, Macropipus rugosus, Macropodia macrocheles, Munida speciosa, Parapenaeus longirostris, Plesionika heterocarpus*

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Maurit-0911	7	MU185	18/11/2009	19º24´46" 17º10´47"	19º27´45" 17º11´41"	1052–1060	Arena	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea multidentata, Plesionika carinata, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	8	MU186	19/11/2009	19º35´44" 19º03´59"	19º34´06" 17º03´19"	174–174	Arena	*Homola barbata, Macropipus rugosus, Munida speciosa, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Spinolambrus notialis*
Maurit-0911	9	MU187	19/11/2009	19º40´26" 17º19´28"	19º43´11" 17º20´41"	1080–1235	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Plesionika carinata, Stereomastis talismani*
Maurit-0911	10	MU188	19/11/2009	19º50´08" 17º25´24"	19º50´05" 17º22´43"	627–627	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Paromola cuvieri, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta*
Maurit-0911	11	MU189	20/11/2009	19º53´38" 17º47´51"	19º55´19" 17º50´29"	1428–1436	Arena	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea tarda, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	12	MU190	20/11/2009	19º56´19" 17º43´13"	19º54´40" 17º42´16"	1095–1173	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Ephyrina* sp, *Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea multidentata, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	14	MU192	20/11/2009	19º59´28" 17º57´28"	19º57´04" 17º59´07"	268–268	Arena	*Palinurus mauritanicus, Parapenaeus longirostris*
Maurit-0911	15	MU193	22/11/2009	19º59´28" 17º57´28"	19º59´01" 17º59´07"	1746–1749	Arena Fangosa	*Acanthephyra pelagica, Glyphocrangon longirostris, Lebbeus africanus, Munidopsis curvirostra, Neolithodes asperrimus, Neolithodes grimaldii, Sergia robusta, Stereomastis nana, Systellaspis debilis*
Maurit-0911	16	MU194	22/11/2009	20º11´00" 17º54´29"	20º09´33" 17º51´54"	1532–1575	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Oplophorus spinosus, Parapagurus pilosimanus, Pasiphaea multidentata, Pasiphaea tarda, Sergia robusta, Stereomastis sculpta, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0911	17	MU195	23/11/2009	20º24´31" 18º03´31"	20º26´10" 18º06´10"	1236–1214	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nephropsis atlantica, Oplophorus spinosus, Pasiphaea multidentata, Pasiphaea tarda, Systellaspis debilis*
Maurit-0911	18	MU196	23/11/2009	20º32´23" 17º56´29"	20º29´53" 17º54´42"	712–719	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea multidentata, Plesionika carinata, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	19	MU197	23/11/2009	20º22´32" 17º48´59"	20º19´35" 17º46´37"	672–678	Arena Fangosa	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Pasiphaea multidentata, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia grandis, Sergia robusta, Systellaspis debilis*
Maurit-0911	20	MU198	24/11/2009	20º42´48" 17º56´47"	20º39´26" 17º58´19"	975–984	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Lithodes ferox, Munidopsis serricornis, Nematocarcinus africanus, Nephropsis atlantica, Oplophorus spinosus, Paralomis cristulata, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	21	MU199	24/11/2009	20º39´26" 17º58´19"	20º36´34" 18º00´10"	778–774	Arena Fangosa	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nematocarcinus africanus, Oplophorus spinosus, Pasiphaea multidentata, Pasiphaea semispinosa, Plesionika carinata, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	22	MU200	25/11/2009	20º41´16" 17º41´53"	20º42´16" 17º40´27"	352–334	Arena	*Aegaeon lacazei, Eusergestes arcticus, Glyphus marsupialis, Homola barbata, Inachus leptochirus, Munida speciosa, Palinurus mauritanicus, Pasiphaea semispinosa, Plesionika acanthonotus, Solenocera africana*
Maurit-0911	23	MU201	25/11/2009	20º40´33" 17º36´07"	20º38´49" 17º36´17"	87–87	Arena	*Munida speciosa, Pagurus cuanensis, Pagurus prideaux, Plesionika heterocarpus*
Maurit-0911	24	MU202	26/11/2009	20º34´54" 17º47´59"	20º36´11" 17º47´55"	390–398	Arena	*Aegaeon lacazei, Hymenopenaeus chacei, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Sergia robusta, Sergia talismani, Solenocera africana*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-0911	25	MU203	26/11/2009	20º36´56" 17º44´02"	20º38´16" 17º42´58"	298–294	Arena	*Palinurus mauritanicus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus*
Maurit-0911	26	MU204	26/11/2009	20º37´53" 17º39´26"	20º39´35" 17º39´01"	155–145	Arena	*Homola barbata, Inachus leptochirus, Munida speciosa, Plesionika heterocarpus, Scyllarus subarctus*
Maurit-0911	27	MU205	27/11/2009	20º33´56" 17º33´28"	20º32´22" 17º36´54"	89–93	Arena	*Inachus angolensis, Macropipus rugosus, Pagurus cuanensis, Pagurus prideaux*
Maurit-0911	28	MU206	28/11/2009	20º26´24" 17º45´13"	20º24´56" 17º44´16"	362–364	Arena	*Aegaeon lacazei, Paragiopagurus macrocerus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Solenocera africana*
Maurit-0911	29	MU207	29/11/2009	20º00´54" 17º32´20"	19º59´52" 17º33´48"	88–117	Fango Arenoso	*Goneplax rhomboides, Inachus nanus, Munida speciosa, Pagurus alatus, Scyllarus subarctus*
Maurit-0911	30	MU208	29/11/2009	20º02´03" 17º32´25"	20º00´38" 17º31´32"	96–79	Fango Arenoso	*Aegaeon lacazei, Macropipus rugosus*
Maurit-0911	31	MU209	29/11/2009	19º57´01" 17º28´59"	19º55´23" 17º29´02"	115–150	Fango Arenoso	*Eurynome aspera*
Maurit-0911	32	MU210	30/11/2009	19º24´53" 16º52´06"	19º23´10" 16º52´25"	86–90	Arena	*Anapagurus laevis, Inachus angolensis, Macropodia gilsoni, Medorippe lanata, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Solenolambrus noordendei*
Maurit-0911	33	MU211	30/11/2009	19º21´50" 16º52´50"	19º21´18" 16º52´35"	92–109		*Pisa armata*
Maurit-0911	34	MU212	30/11/2009	19º19´55" 16º54´08"	19º18´19" 16º56´04"	163–200	Arena	*Inachus angolensis, Inachus nanus, Monodaeus cristulatus, Parapenaeus longirostris, Plesionika heterocarpus, Pseudomyra mbizi, Solenolambrus noordendei*
Maurit-0911	35	MU213	02/12/2009	17º37´22" 16º47´17"	17º40´08" 16º48´28"	982–986	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Pasiphaea multidentata, Plesionika carinata, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	36	MU214	02/11/2009	17º22´35" 16º45´41"	17º24´29" 16º44´02"	650–588	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Bathynectes piperitus, Glyphus marsupialis, Goneplax barnardi, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Sergia talismani*
Maurit-0911	37	MU215	02/12/2009	17º29´44" 16º39´31"	17º28´06" 16º40´10"	358–364	Arena	*Munida speciosa, Parapenaeus longirostris, Plesionika edwardsii, Solenocera africana, Trypaea oblonga*

Campaña	**Lance**	**Código**	**Fecha**	**Latitud (N) Longitud (O) inicio**	**Latitud (N) Longitud (O) fin**	**Profundidad (m) Inicio-fin**	**Naturaleza del fondo**	**Especies**
Maurit-0911	38	MU216	16/06/2009	16º06´20" 16º58´01"	16º08´07" 16º55´60"	422–422	Arena Fangosa	*Aegaeon lacazei, Goneplax barnardi, Munida speciosa, Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika brevipes, Plesionika carinata, Plesionika martia, Sergia robusta, Solenocera africana*
Maurit-0911	39	MU217	04/12/2009	16º17´47" 16º47´36"	16º14´11" 16º48´17"	111–113	Arena	*Macropodia gilsoni, Munida speciosa,* Paguroidea indet, *Pagurus cuanensis, Scyllarus subarctus*
Maurit-0911	40	MU218	04/12/2009	16º09´09" 16º46´53"	16º10´50" 16º46´29"	97–94	Arena	*Munida speciosa,* Paguroidea indet
Maurit-0911	41	MU219	06/12/2009	16º12´13" 16º50´28"	16º13´35" 16º50´01"	125–129	Arena	*Monodaeus cristulatus, Scyllarus subarctus*
Maurit-0911	43	MU221	07/12/2009	17º07´58" 16º59´58"	17º05´01" 16º59´54"	1318–1384	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Metacrangon bellmarleyi, Munidopsis chunii, Plesionika carinata, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	44	MU222	07/12/2009	17º13´22" 16º51´52"	17º16´16" 16º51´04"	729–723	Arena Fangosa	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Hymenopenaeus chacei, Nematocarcinus africanus, Parapagurus pilosimanus, Parapontophilus gracilis gracilis, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani*
Maurit-0911	45	MU223	09/12/2009	17º48´20" 16º26´40"	17º46´46" 16º26´55"	116–117	Arena	*Homola barbata, Macropodia gilsoni, Munida speciosa*
Maurit-0911	46	MU224	09/12/2009	17º36´05" 16º31´52"	17º34´40" 16º32´23"	173–177	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris*
Maurit-0911	47	MU225	09/12/2009	17º17´11" 16º46´05"	17º15´47" 16º46´35"	385–397	Arena	*Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika brevipes, Plesionika martia, Solenocera africana*
Maurit-0911	48	MU226	09/12/2009	16º55´55" 16º44´58"	16º57´43" 16º45´16"	109–107	Arena	*Inachus aguiarii, Munida speciosa*
Maurit-0911	49	MU227	10/12/2009	17º48´20" 16º30´33"	17º50´10" 16º30´32"	183–181	Arena	*Goneplax rhomboides, Macropipus rugosus, Parapenaeus longirostris*
Maurit-0911	50	MU228	10/12/2009	18º01´06" 16º28´12"	18º01´47" 16º26´47"	136–172	Arena	*Pagurus cuanensis, Scyllarus subarctus*

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Maurit-0911	51	MU229	10/12/2009	18º05´01" 16º34´32"	18º06´31" 16º34´35"	386–391	Arena	*Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika brevipes, Plesionika carinata, Plesionika edwardsii, Plesionika heterocarpus, Solenocera africana, Systellaspis debilis*
Maurit-0911	52	MU230	12/12/2009	18º27´35" 16º54´26"	18º27´43" 16º53´28"	1312–1306	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Metacrangon bellmarleyi, Munidopsis chunii, Pasiphaea multidentata, Pasiphaea tarda, Plesionika carinata, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	53	MU231	12/12/2009	18º39´38" 16º53´32"	18º36´48" 16º52´02"	1003–1003	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea multidentata, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	54	MU232	13/12/2009	19º02´21" 16º48´58"	19º00´20" 16º48´45"	268–268	Arena	*Parapenaeus longirostris, Plesionika heterocarpus*
Maurit-0911	55	MU233	13/12/2009	18º44´26" 16º37´12"	18º43´50" 16º38´48"	165–189	Arena	*Macropodia gilsoni, Macropodia macrocheles, Munida speciosa, Plesionika heterocarpus, Solenolambrus noordendei*
Maurit-0911	56	MU234	14/12/2009	19º08´55" 16º48´26"	19º07´28" 16º48´08"	286–286	Arena	*Palinurus mauritanicus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus*
Maurit-0911	57	MU235	14/12/2009	19º01´34" 16º41´55"	19º00´00" 16º42´04"	123–123	Arena	*Macropodia gilsoni*
Maurit-1011	1	MU236	16/11/2010	20º39´40" 17º53´36"	20º41´43" 17º50´50"	628–610	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus ensifer, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Oplophorus spinosus, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Systellaspis debilis*
Maurit-1011	2	MU237	16/11/2010	20º40´59" 18º12´44"	20º40´14" 18º15´59"	1298–1298	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Oplophorus spinosus, Pasiphaea multidentata, Pasiphaea tarda, Sergia grandis, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	3	MU238	17/11/2010	20º31´22" 18º32´60"	20º34´03" 18º32´14"	1787–1772	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Glyphocrangon longirostris, Stereomastis nana*
Maurit-1011	4	MU239	17/11/2010	20º18´09" 18º12´47"	20º17´35" 18º09´47"	1775–1773		*Acanthephyra pelagica, Munidopsis curvirostra, Stereomastis talismani*

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Maurit-1011	5	MU240	18/11/2010	20º26´46" 17º40´13"	20º28´30" 17º40´19"	106–108	Arena	*Dardanus arrosor, Munida speciosa, Plesionika heterocarpus*
Maurit-1011	6	MU241	19/11/2010	20º24´40" 17º50´07"	20º27´44" 17º51´46"	669–650	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Pasiphaea multidentata, Plesionika carinata, Sergia robusta, Systellaspis debilis*
Maurit-1011	7	MU242	19/11/2010	20º24´28" 18º07´19"	20º23´37" 18º04´26"	1303–1290	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Metacrangon bellmarleyi, Pasiphaea tarda, Sergia grandis, Stereomastis nana, Systellaspis debilis*
Maurit-1011	8	MU243	20/11/2010	20º10´10" 17º42´28"	20º11´26" 17º45´21"	827–850	Arena	*Acanthephyra pelagica, Aristeus varidens,* Caridea indet, *Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Notostomus crosnieri, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Systellaspis debilis*
Maurit-1011	9	MU244	20/11/2010	20º06´53" 17º39´08"	20º05´10" 17º38´37"	271–257	Arena	*Munida speciosa, Parapenaeus longirostris*
Maurit-1011	10	MU245	20/11/2010	19º54´05" 17º51´59"	19º55´57" 17º54´16"	1515–1557	Arena	*Acanthephyra pelagica, Ephyrina figueirai figueirai, Glyphus marsupialis, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea tarda, Stereomastis sculpta*
Maurit-1011	11	MU246	21/11/2010	19º48´50" 17º38´48"	19º49´36" 17º41´41"	1382–1436	Fango Arenoso	*Acanthephyra eximia, Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea multidentata, Pasiphaea tarda, Sergia grandis, Stereomastis sculpta, Stereomastis talismani, Systellaspis cristata, Systellaspis debilis*
Maurit-1011	12	MU247	21/11/2010	19º49´50" 17º50´51"	19º51´10" 17º53´31"	1700–1698	Arena	*Acanthephyra pelagica, Neolithodes asperrimus, Pasiphaea tarda, Stereomastis nana, Stereomastis sculpta*
Maurit-1011	13	MU248	22/11/2010	19º56´07" 17º37´40"	19º58´04" 17º39´52"	726–726	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea multidentata, Psathyrocaris fragilis, Sergia grandis, Sergia robusta, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	14	MU249	22/11/2010	19º51´15" 17º44´03"	19º52´35" 17º46´01"	1430–1440	Fango Arenoso	*Acanthephyra eximia*, *Acanthephyra pelagica*, *Benthesicymus bartletti*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Notostomus crosnieri*, *Pasiphaea tarda*, *Sergia grandis*, *Stereomastis sculpta*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1011	15	MU250	22/11/2010	19º43´50" 17º42´29"	19º41´56" 17º40´08"	1747–1867	Fango Arenoso	*Acanthephyra eximia*, *Benthesicymus bartletti*, *Glyphocrangon longirostris*, *Glyphus marsupialis*, *Munidopsis curvirostra*, *Pasiphaea tarda*, *Stereomastis nana*
Maurit-1011	16	MU251	24/11/2010	19º50´43" 17º17´14"	19º51´16" 17º18´46"	107–107	Fango Arenoso	*Inachus angolensis*
Maurit-1011	17	MU252	24/11/2010	19º44´36" 17º11´08"	19º45´03" 17º12´36"	337–502	Fango Arenoso	*Palinurus mauritanicus*, *Parapenaeus longirostris*, *Pasiphaea semispinosa*, *Plesionika heterocarpus*
Maurit-1011	18	MU253	24/11/2010	19º39´35" 17º12´37"	19º41´47" 17º14´36"	723–743	Fango Arenoso	*Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Hymenopenaeus chacei*, *Nematocarcinus africanus*, *Parapenaeus longirostris*, *Pasiphaea multidentata*, *Psathyrocaris fragilis*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1011	19	MU254	25/11/2010	19º38´52" 17º06´25"	19º38´37" 17º05´01"	241–293	Arena	*Palinurus mauritanicus*, *Parapenaeus longirostris*, *Pasiphaea semispinosa*, *Plesionika heterocarpus*
Maurit-1011	20	MU255	25/11/2010	19º27´04" 17º06´11"	19º24´11" 17º05´16"	687–803	Arena	*Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Hymenopenaeus chacei*, *Nematocarcinus africanus*, *Parapenaeus longirostris*, *Pasiphaea multidentata*, *Plesionika carinata*, *Psathyrocaris fragilis*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1011	21	MU256	25/11/2010	19º35´00" 17º16´02"	19º36´40" 17º18´43"	1160–1160	Fango Arenoso	*Acanthephyra eximia*, *Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Hymenopenaeus chacei*, *Pasiphaea* sp, *Pasiphaea tarda*, *Sergia grandis*, *Stereomastis talismani*, *Systellaspis debilis*
Maurit-1011	22	MU257	28/11/2010	19º14´13" 17º20´55"	19º11´47" 17º19´09"	1652–1698	Fango Arenoso	*Acanthephyra pelagica*, *Benthesicymus bartletti*, *Glyphus marsupialis*, *Notostomus crosnieri*, *Pasiphaea tarda*, *Sergia grandis*, *Stereomastis nana*, *Stereomastis sculpta*
Maurit-1011	23	MU258	28/11/2010	19º20´42" 17º13´23"	19º23´26" 17º14´41"	1293–1269	Arena	*Acanthephyra pelagica*, *Aristeus varidens*, *Glyphus marsupialis*, *Heterocarpus grimaldii*, *Hymenopenaeus chacei*, *Metacrangon bellmarleyi*, *Pasiphaea multidentata*, *Pasiphaea tarda*, *Plesionika carinata*, *Sergia grandis*, *Sergia robusta*, *Stereomastis sculpta*, *Stereomastis talismani*, *Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	24	MU259	28/11/2010	19º16´50" 17º57´31"	19º14´43" 17º56´26"	557–557	Arena	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Metacrangon bellmarleyi, Nematocarcinus africanus, Oplophorus spinosus, Pasiphaea multidentata, Plesionika carinata, Plesionika* sp*, Psathyrocaris fragilis, Sergia robusta, Systellaspis debilis*
Maurit-1011	25	MU260	29/11/2010	19º12´38" 16º43´31"	19º14´08" 16º44´20"	101–120	Arena	*Dardanus arrosor, Farfantepenaeus notialis, Inachus angolensis, Metapenaeopsis miersi, Pagurus alatus, Parapenaeus longirostris*
Maurit-1011	26	MU261	29/11/2010	19º14´26" 16º44´14"	19º13´19" 16º46´02"	111–146	Arena	*Inachus nanus, Parapenaeus longirostris, Pisa armata*
Maurit-1011	27	MU262	29/11/2010	19º12´51" 16º49´48"	19º14´17" 16º50´36"	247–448	Arena	*Munida speciosa, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika heterocarpus*
Maurit-1011	28	MU263	29/11/2010	19º00´43" 16º52´26"	18º57´50" 16º52´52"	615–624	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Paromola cuvieri, Pasiphaea multidentata, Pasiphaea semispinosa, Plesionika carinata, Plesionika heterocarpus, Psathyrocaris fragilis, Sergia grandis, Sergia robusta*
Maurit-1011	29	MU264	30/11/2010	18º53´42" 17º00´58"	18º50´40" 17º00´58"	1176–1145	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Pasiphaea tarda, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	30	MU265	01/12/2010	18º05´28" 16º36´31"	18º02´26" 16º37´00"	556–556	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Munida speciosa, Nematocarcinus africanus, Parapontophilus gracilis gracilis, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	31	MU266	01/12/2010	17º57´46" 16º24´13"	17º55´56" 16º23´46"	103–103	Arena	*Areopaguristes mauritanicus, Dardanus arrosor, Macropipus rugosus, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Scyllarus caparti*
Maurit-1011	32	MU267	02/12/2010	17º58´53" 16º39´38"	18º01´43" 16º38´43"	673–670	Fango Arenoso	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Chaceon maritae, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea multidentata, Plesionika carinata, Psathyrocaris fragilis, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	33	MU268	03/12/2010	17º48´04" 16º48´08"	17º44´53" 16º48´25"	937–938	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Nematocarcinus africanus, Plesionika carinata, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	34	MU269	03/12/2010	17º36´36" 17º00´20"	17º33´46" 17º00´19"	1677–1717	Arena Fangosa	*Neolithodes asperrimus, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani*
Maurit-1011	35	MU270	04/12/2010	17º16´57" 17º02´18"	17º18´43" 17º00´58"	1547–1476	Arena Fangosa	*Acanthephyra eximia, Acanthephyra pelagica, Glyphus marsupialis, Hymenopenaeus chacei, Pasiphaea tarda, Sergia grandis, Stereomastis sculpta, Stereomastis talismani, Systellaspis cristata, Systellaspis debilis*
Maurit-1011	36	MU271	04/12/2010	17º09´52" 16º57´28"	17º06´59" 16º56´28"	1114–1105	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Plesionika carinata, Psathyrocaris fragilis, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	37	MU272	05/12/2010	16º30´49" 17º04´11"	16º34´30" 17º03´07"	1361–1329	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Hymenopenaeus chacei, Notostomus crosnieri, Pasiphaea tarda, Sergia grandis, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	38	MU273	05/12/2010	16º42´43" 17º09´16"	16º44´23" 17º09´59"	1657–1656	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Pelagopenaeus balboae, Sergia grandis, Stereomastis nana*
Maurit-1011	39	MU274	06/12/2010	16º08´44" 17º10´08"	16º11´14" 17º08´40"	1590–1599	Arena Fangosa	*Acanthephyra curtirostris, Acanthephyra eximia, Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Parapasiphae sulcatifrons, Pasiphaea tarda, Sergia grandis, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani*
Maurit-1011	40	MU275	06/12/2010	16º24´07" 17º00´32"	16º27´04" 17º00´37"	1275–1214	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Benthesicymus bartletti, Glyphus marsupialis, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Notostomus crosnieri, Pasiphaea tarda, Sergia robusta, Stereomastis sculpta, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	41	MU276	07/12/2010	16º18´56" 16º53´25"	16º21´53" 16º52´41"	637–562	Arena	*Acanthephyra pelagica, Aristeus antennatus, Aristeus varidens, Bathynectes piperitus, Calocarides coronatus, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	42	MU277	07/12/2010	16º15´19" 16º47´58"	16º16´55" 16º47´22"	112–110	Arena	*Inachus aguiarii, Macropodia longipes, Munida speciosa, Scyllarus subarctus*
Maurit-1011	43	MU278	08/12/2010	16º06´57" 16º58´44"	16º08´35" 16º57´27"	509–557	Arena Fangosa	*Acanthephyra pelagica, Aristeus varidens, Hymenopenaeus chacei, Nematocarcinus africanus, Pasiphaea semispinosa, Plesionika carinata, Plesionika martia, Sergia robusta, Systellaspis debilis*
Maurit-1011	44	MU279	08/12/2010	16º28´24" 16º48´10"	16º29´56" 16º47´58"	170–170	Arena	*Parapenaeus longirostris*
Maurit-1011	45	MU280	08/12/2010	16º33´56" 16º47´49"	16º34´50" 16º46´27"	230–239	Arena	*Macropodia macrocheles, Parapenaeus longirostris, Plesionika carinata, Plesionika heterocarpus, Solenocera africana*
Maurit-1011	46	MU281	09/12/2010	16º53´26" 16º45´19"	16º51´45" 16º45´47"	100–106	Arena	*Homola barbata*
Maurit-1011	47	MU282	10/12/2010	17º07´60" 16º47´49"	17º09´36" 16º48´09"	402–473	Arena	*Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika brevipes, Plesionika martia, Solenocera africana*
Maurit-1011	48	MU283	11/12/2010	17º08´40" 16º31´34"	17º10´10" 16º30´32"	92–91	Arena	*Dardanus arrosor, Pagurus cuanensis*
Maurit-1011	49	MU284	11/12/2010	17º21´26" 16º38´31"	17º23´00" 16º37´39"	207–203	Arena	*Parapenaeus longirostris*
Maurit-1011	50	MU285	11/12/2010	17º27´50" 16º30´34"	17º29´38" 16º30´23"	128–132	Arena	*Macropipus rugosus, Munida speciosa, Parapenaeus longirostris*
Maurit-1011	51	MU286	12/12/2010	17º46´20" 16º39´22"	17º49´14" 16º38´37"	436–427	Arena	*Heterocarpus ensifer, Hymenopenaeus chacei, Nematocarcinus africanus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika carinata, Sergia robusta, Solenocera africana, Systellaspis debilis*
Maurit-1011	52	MU287	12/12/2010	18º07´11" 16º40´16"	18º10´14" 16º40´16"	846–861	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Notostomus crosnieri, Plesionika carinata, Sergia grandis, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-1011	53	MU288	13/12/2010	18º01´37" 16º48´56"	18º04´20" 16º47´53"	1258–1220	Fango Arenoso	*Acanthephyra pelagica, Aristeus varidens, Heterocarpus grimaldii, Hymenopenaeus chacei, Munidopsis chunii, Pasiphaea multidentata, Stereomastis talismani, Systellaspis debilis*

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Maurit-1011	54	MU289	13/12/2010	18º27´05" 16º58´18"	18º29´57" 16º59´05"	1560–1572	Arena Fangosa	*Acanthephyra pelagica, Benthesicymus bartletti, Ephyrina figueirai figueirai, Glyphus marsupialis, Hymenopenaeus chacei, Neolithodes asperrimus, Pasiphaea multidentata, Pasiphaea tarda, Stereomastis nana, Stereomastis sculpta, Stereomastis talismani, Systellaspis pellucida*
Maurit-1011	55	MU290	14/12/2010	18º16´53" 16º35´23"	18º18´44" 16º35´35"	311–311	Arena	*Euchirograpsus liguricus, Monodaeus cristulatus, Parapenaeus longirostris, Plesionika acanthonotus, Solenocera africana*
Maurit-1011	56	MU291	14/12/2010	18º26´32" 16º29´17"	18º26´22" 16º31´18"	106–137	Arena	*Inachus angolensis, Macropipus rugosus, Munida speciosa, Parapenaeus longirostris, Plesionika narval*
Maurit-0911	BV01	MUBV01	21/11/2009	20º09´46" 17º36´52"	20º10´06" 17º36´51"	112–112	Arena	*Aegaeon cataphractus, Alpheus talismani, Calappa pelii, Dardanus arrosor, Ethusa rugulosa, Inachus angolensis, Macropipus rugosus, Medorippe lanata, Pagurus alatus, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Pseudomyra mbizi, Scyllarus subarctus, Solenolambrus noordendei*
Maurit-0911	BV02	MUBV02	21/11/2009	20º07´36" 17º39´36"	20º07´47" 17º39´42"	318–330	Arena	*Acanthocarpus brevispinis, Bathynectes piperitus, Dardanus arrosor, Ethusa rugulosa, Eusergestes arcticus, Homola barbata, Inachus angolensis, Munida speciosa, Paragiopagurus macrocerus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika heterocarpus, Plesionika martia, Sergia talismani, Solenocera africana, Solenolambrus noordendei*
Maurit-0911	BV03	MUBV03	21/11/2009	20º07´04" 17º40´48"	20º07´18" 17º40´54"	528–538	Arena	*Bathynectes piperitus, Chaceon maritae,* Crangonidae indet, *Goneplax barnardi, Munida speciosa,* Paguridae indet, *Paragiopagurus macrocerus, Paromola cuvieri, Plesionika acanthonotus, Plesionika carinata, Polycheles typhlops*
Maurit-0911	BV04	MUBV04	21/11/2009	20º02´16" 17º44´26"	20º02´29" 17º44´36"	1062–1090	Arena	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Goneplax barnardi, Heterocarpus grimaldii, Hymenopenaeus chacei, Nephropsis* sp, *Plesionika carinata, Systellaspis debilis*
Maurit-0911	BV05	MUBV05	21/11/2009	20º05´10" 17º50´01"	20º05´24" 17º49´60"	1536–1576	Arena fangosa	*Benthesicymus bartletti, Hymenopenaeus chacei, Systellaspis debilis*
Maurit-0911	BV06	MUBV06	25/11/2009	20º45´20" 18º11´13"	20º45´34" 18º11´05"	1588–1618	Arena fangosa	*Acanthephyra pelagica, Parapagurus pilosimanus*
Maurit-0911	BV07	MUBV07	25/11/2009	20º43´34" 18º01´44"	20º43´50" 18º01´38"	1092–1122	Fango arenoso	*Glyphus marsupialis, Heterocarpus grimaldii, Nephropsis* sp, *Parapagurus pilosimanus, Sergia robusta, Systellaspis debilis*

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Maurit-0911	BV08	MUBV08	26/11/2009	20º44´50" 17º38´47"	20º45´03" 17º38´37"	174–168	Arena	*Dardanus arrosor, Homola barbata, Liocarcinus corrugatus, Monodaeus cristulatus, Munida speciosa, Palinurus mauritanicus, Pseudopaguristes marocanus, Scyllarus subarctus*
Maurit-0911	BV09	MUBV09	27/11/2009	20º43´34" 17º45´48"	20º43´43" 17º45´25"	549–555	Arena fangosa	*Aegaeon lacazei, Alpheus talismani, Bathynectes piperitus, Eusergestes arcticus, Goneplax barnardi, Hymenopenaeus chacei, Munida speciosa, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata*
Maurit-0911	BV10	MUBV10	27/11/2009	20º44´25" 17º40´07"	20º44´37" 17º40´16"	332–344	Arena	*Aegaeon lacazei, Atelecyclus rotundatus, Bathynectes piperitus, Cymonomus granulatus, Dardanus arrosor, Ebalia nux, Ethusa rugulosa, Homola barbata, Inachus grallator, Inachus leptochirus, Monodaeus cristulatus, Munida speciosa, Pagurus pubescentulus, Palinurus mauritanicus, Paragiopagurus macrocerus, Pasiphaea semispinosa, Plesionika acanthonotus, Pseudopaguristes marocanus, Solenocera africana, Solenolambrus noordendei*
Maurit-0911	BV11	MUBV11	03/12/2009	16º47´42" 17º04´55"	16º47´31" 17º05´08"	1517–1508	Arena fangosa	*Acanthephyra pelagica, Stereomastis talismani*
Maurit-0911	BV12	MUBV12	03/12/2009	16º48´01" 16º57´01"	16º48´14" 16º56´59"	1025–1043	Arena fangosa	*Acanthephyra pelagica, Hymenopenaeus chacei, Hymenopenaeus chacei, Nephropsis atlantica, Pasiphaea multidentata, Sergia robusta, Stereomastis talismani, Systellaspis debilis*
Maurit-0911	BV13	MUBV13	03/12/2009	16º46´23" 16º50´37"	16º46´31" 16º50´58"	493–517	Arena fangosa	*Acanthocarpus brevispinis, Bathynectes piperitus, Chaceon maritae, Goneplax barnardi, Hymenopenaeus chacei, Nephropsis atlantica, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Psathyrocaris fragilis, Sergia robusta, Stereomastis talismani*
Maurit-0911	BV14	MUBV14	03/12/2009	16º46´02" 16º47´36"	16º45´49" 16º47´33"	300–281	Arena	*Acanthocarpus brevispinis, Bathynectes piperitus, Euchirograpsus liguricus, Goneplax barnardi, Goneplax rhomboides, Inachus angolensis, Inachus grallator, Monodaeus cristulatus, Parapenaeus longirostris, Plesionika acanthonotus, Plesionika acanthonotus, Plesionika heterocarpus, Sergia talismani, Solenocera africana*
Maurit-0911	BV15	MUBV15	03/12/2009	16º46´27" 16º45´08"	16º46´39" 16º44´56"	148–135	Arena	*Calappa pelii, Inachus angolensis, Macropodia gilsoni, Monodaeus cristulatus, Munida speciosa,* Paguroidea indet, *Parapenaeus longirostris, Pisa armata, Plesionika heterocarpus, Plesionika heterocarpus, Pseudomyra mbizi, Solenocera africana, Solenolambrus noordendei*

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Maurit-0911	BV16	MUBV16	11/12/2009	18º29´11" 16º59´19"	18º29´21" 16º59´35"	1588–1630	Arena fangosa	*Hymenopenaeus chacei, Stereomastis talismani*
Maurit-0911	BV17	MUBV17	11/12/2009	18º28´37" 16º50´03"	18º28´23" 16º50´01"	1022–1026	Arena fangosa	*Acanthephyra* sp, *Ethusa rosacea, Glyphus marsupialis, Stereomastis talismani*
Maurit-0911	BV18	MUBV18	11/12/2009	18º28´27" 16º42´43"	18º28´14" 16º42´40"	559–574	Arena fangosa	*Bathynectes piperitus, Glyphus marsupialis, Goneplax barnardi, Heterocarpus ensifer, Hymenopenaeus chacei, Munida speciosa, Paguristes candelae, Pagurus alatus, Paragiopagurus macrocerus, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika carinata, Sergia robusta*
Maurit-0911	BV19	MUBV19	11/12/2009	18º27´35" 16º38´02"	18º27´22" 16º37´58"	306–306	Arena	*Acanthocarpus brevispinis, Aegaeon lacazei, Bathynectes piperitus, Dardanus arrosor, Galathea wolffi, Goneplax barnardi, Munida speciosa, Pagurus pubescentulus, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus, Plesionika heterocarpus, Solenocera africana*
Maurit-0911	BV20	MUBV20	12/12/2009	18º28´16" 16º32´37"	18º28´02" 16º32´32"	155–155	Arena	*Dardanus arrosor, Ethusa rugulosa, Macropipus rugosus, Munida speciosa, Pagurus alatus, Pagurus cuanensis, Parapenaeus longirostris, Plesionika acanthonotus, Plesionika heterocarpus, Scyllarus subarctus*
Maurit-1011	BV01	MUBV21	23/11/2010	19º50´36" 17º17´13"	19º50´41" 17º17´40"	107–109	Fango arenoso	*Anapagurus laevis, Areopaguristes mauritanicus, Calappa pelii, Dardanus arrosor, Distolambrus maltzami, Ethusa rugulosa, Homola barbata, Inachus angolensis, Macropipus rugosus, Macropodia gilsoni, Medorippe lanata, Munida speciosa, Pagurus alatus, Pagurus cuanensis, Parapenaeus longirostris, Plesionika heterocarpus, Processa nouveli, Solenolambrus noordendei, Spinolambrus notialis*
Maurit-1011	BV02	MUBV22	23/11/2010	19º49´07" 17º17´25"	19º49´14" 17º17´47"	300–300	Fango arenoso	*Acanthocarpus brevispinis, Aegaeon lacazei, Bathynectes piperitus, Dardanus arrosor, Macropodia macrocheles, Munida speciosa, Palinurus mauritanicus, Parapenaeus longirostris, Paromola cuvieri, Plesionika acanthonotus, Plesionika martia*
Maurit-1011	BV03	MUBV23	23/11/2010	19º37´47" 17º26´12"	19º37´33" 17º25´54"	1478–1473	Fango arenoso	*Acanthephyra pelagica, Benthesicymus bartletti, Hymenopenaeus chacei, Metacrangon jacqueti, Pasiphaea ecarina, Systellaspis cristata, Systellaspis debilis*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	BV04	MUBV24	24/11/2010	19º46´17" 17º23´47"	19º46´03" 17º23´16"	968–1077	Fango arenoso	*Acanthephyra pelagica, Aristeus varidens, Glyphus marsupialis, Hymenopenaeus chacei, Nematocarcinus africanus, Nephropsis atlantica*
Maurit-1011	BV05	MUBV25	24/11/2010	19º48´09" 17º17´50"	19º47´56" 17º17´23"	499–520	Fango arenoso	*Aristeus varidens, Bathynectes piperitus, Goneplax barnardi, Hymenopenaeus chacei, Plesionika acanthonotus*
Maurit-0911	DR01	MUDR01	05/12/2009	16º08´24" 16º57´12"		488	fragmentos de coral (Barrera)	*Alpheus macrocheles, Bathynectes piperitus, Eumunida bella, Eumunida bella, Monodaeus cristulatus, Munidopsis serricornis, Neopilumnoplax corallicola, Paragiopagurus macrocerus*
Maurit-0911	DR03	MUDR03	06/12/2009	16º42´22" 16º51´25"		407	fango arenoso con fragmentos de coral (Barrera)	*Bathynectes piperitus, Paragiopagurus macrocerus*
Maurit-0911	DR04	MUDR04	08/12/2009	17º56´22" 16º37´13"		426	fragmentos de coral con fango (Barrera)	*Bathynectes piperitus*
Maurit-0911	DR05	MUDR05	08/12/2009	18º08´43" 16º35´42"		421	fragmento de coral con fango arenoso (Barrera)	*Monodaeus cristulatus*
Maurit-0911	DR06	MUDR06	10/12/2009	17º40´22" 16º40´11"		435	fango con fragmentos de coral y bloque de conglomerado biogénico (Barrera)	*Calocaris macandreae, Monodaeus cristulatus*
Maurit-0911	DR07	MUDR07	12/12/2009	18º35´40" 16º43´12"		460	fango con fragmentos de coral y conchas (Barrera)	*Monodaeus cristulatus, Sergia robusta*
Maurit-0911	DR08	MUDR08	13/12/2009	19º07´20" 16º50´31"		470	fragmentos de coral y conchas (Cañón)	*Ezaxius ferachevali, Monodaeus cristulatus, Paragiopagurus macrocerus, Paragiopagurus macrocerus*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	DR01	MUDR09	19/11/2010	20º14´36" 17º40´10"		525	fragmentos de coral con fango arenoso y fragmentos de roca arenisca (Cañón)	*Alpheus macrocheles, Calocarides coronatus, Eumunida bella*
Maurit-1011	DR02	MUDR10	22/11/2010	19º50´01" 17º37´03"		520	fango arenoso con fragmentos de coral (Cañón)	*Calocarides coronatus, Cymonomus granulatus, Munidopsis vaillantii*
Maurit-1011	DR03	MUDR11	26/11/2010	19º38´25" 17º06´52"		322	bloques de roca arenisca(Cañón)	*Aegaeon lacazei, Calocaris macandreae, Dardanus arrosor, Eumunida bella, Homola barbata, Monodaeus cristulatus, Munida intermedia, Parapenaeus longirostris, Pasiphaea semispinosa, Plesionika acanthonotus*
Maurit-1011	DR04	MUDR12	26/11/2010	19º52´38" 17º22´23"		485	fragmentos de coral con fango (Cañón)	*Calocaris macandreae, Cymonomus granulatus, Hymenopenaeus chacei, Paguristes candelae*
Maurit-1011	DR05	MUDR13	27/11/2010	19º50´43" 17º29´36"		935	fango (Cañón)	*Paralomis cristulata, Systellaspis debilis*
Maurit-1011	DR06	MUDR14	27/11/2010	19º36´53" 17º04´15"		243	bloques de rocas caliza y arenisca (Cañón)	Decapoda indet, *Monodaeus cristulatus*
Maurit-1011	DR08	MUDR16	27/11/2010	19º30´59" 17º05´54"		474	fragmentos de origen biogénico y roca (Cañón)	*Calocaris macandreae, Hymenopenaeus chacei*
Maurit-1011	DR09	MUDR17	30/11/2010	19º25´16" 17º01´04"		468	fango con fragmentos de corales y conchas, bloques de caliza (Cañón)	*Bathynectes piperitus, Cymonomus granulatus, Goneplax barnardi, Munidopsis vaillantii*

Campaña	Lance	Código	Fecha	Latitud (N) Longitud (O) inicio	Latitud (N) Longitud (O) fin	Profundidad (m) Inicio-fin	Naturaleza del fondo	Especies
Maurit-1011	DR11	MUDR19	07/12/2010	16º09´06" 16º56´50"		561	fragmentos de coral con fango (Barrera)	*Munidopsis serricornis, Munidopsis vaillantii*
Maurit-1011	DR12	MUDR20	07/12/2010	16º08´11" 16º56´08"		405	fragmentos de coral (Barrera)	*Alpheus macrocheles, Eumunida bella, Monodaeus cristulatus, Munida sanctipauli, Munidopsis serricornis, Munidopsis vaillantii, Sergia robusta*
Maurit-1011	DR13	MUDR21	09/12/2010	16º28´13" 16º51´43"		522	fragmentos de coral con fango (Barrera)	*Calocaris macandreae, Munidopsis serricornis, Sergia robusta*
Maurit-1011	DR14	MUDR22	09/12/2010	16º47´30" 16º50´28"		460	fragmentos de coral con fango (Barrera)	*Calocaris macandreae, Goneplax barnardi, Monodaeus cristulatus, Nematocarcinus africanus*
Maurit-1011	DR15	MUDR23	10/12/2010	17º08´46" 16º46´38"		240	bloques y restos de chimeneas hidrotermales (Montaña)	*Acanthocarpus brevispinis, Dardanus arrosor, Euchirograpsus liguricus, Goneplax rhomboides, Homola barbata, Monodaeus cristulatus, Solenocera* sp
Maurit-1011	DR17	MUDR25	11/12/2010	17º07´43" 16º49´06"		435	fango con fragmentos de coral (Barrera)	*Goneplax barnardi*
Maurit-1011	DR18	MUDR26	12/12/2010	17º29´42" 16º41´04"		441	fango con fragmentos de coral (Barrera)	*Goneplax barnardi, Monodaeus cristulatus, Trypaea oblonga*

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